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THE PHARMACEUTICAL SOCIETY.—PAINTED BY ITSELF.

Any man with time, money, energy, and position can found an institution. He can obtain a charter; he can frame bye-laws; he can secure members; he can start a special journal to report progress, and he can build, or adapt a nest for his hopeful offspring. He can do all this, and more; but there is one thing beyond his power. If the institution is not practical in its objects and ends; liberal in its management, and if the advantages he offers to members are not a little above the level of subscriptions and the trouble of qualifying for membership, he cannot make the institution pay. He may not find this out for a year—for five years, or, perhaps, for twenty years; he may even die before the melancholy truth is forced upon him; but some committee, trustees, or hereditary managers will sooner or later have to stare it in the face. If the vessel has not been built and steered according to the everlasting laws of trade, it will inevitably split upon its appointed rock, and the scattered crew will be glad of any tub or spar that promises to float them out of danger.

There is the Pharmaceutical Society of Great Britain, of which we are always looked upon as the most obstinate opponents. We need hardly say that this is a delusion; and that by telling the truth about its management—more in sorrow than in anger—we claim to be considered its best supporters. We have often painted its condition; this time we will take its own organ as a guide, and give its picture as painted by its friends.

For all the whining in the *Pharmaceutical Journal* for this month, no one will deny that it sprang into life with every prospect of a long and vigorous career. It was heralded with many flourishes of many trumpets, and was to create and consolidate a new class of scientific tradesmen. The simplest drug was no longer to be dispensed by daring amateurs of pharmacy, but by staid analytical chemists, who condescended to stand behind a counter. Quackery was to be destroyed by being beaten out of the field, and the drug trade was to be torn from its degrading connexion with grocery stores and pickle warehouses. An Act of Parliament, called the Pharmacy Act, was obtained as a first instalment of protective legislation, and those who had tasted this felt an appetite to ask for more. The time, it was thought, was not far distant when some grand compulsory enactment would be obtained that would make it felony to deal in drugs without the ornamental diploma of the Society. The sun of free trade was to stand still in its course, for this occasion only. The managers of the Society did their best to nourish these hopes, although they ought to have known that there was no chance that they would ever be gratified. The object, however, was gained as long as a certain number of members were gathered into the fold. A few years taught those members that they had committed themselves to a trading mistake. They had paid subscriptions, undergone examinations, received the stamp of learning—major or minor—impressed upon them by the board of examiners; but they had not increased their profits. They found themselves a few paces in advance of public opinion; and their only course was to wait until public opinion reached them. They were trained to sell something for which there was little or no demand, and although they felt superior to the outside, uncertificated dealer in drugs and chemicals, this was all the satisfaction they had for their money and trouble. The outside, uncertificated dealer competed with them for public patronage, and was often the winner in the race. In many villages and districts this "tradesman" was the only possible chemist and druggist, unless his pharmaceutical opponent—bound not to soil his fingers with moist sugar and pickled pork—could eke out his scanty income by fancy chemical lectures, with experiments, at the local Literary Institute, or could obtain an engagement as parish organist.

For some years past the whole Pharmaceutical Society has been alive to these facts, and conscious of the mistaken basis of its constitution. Its scheme has been tested by the much-abused, but secretly-worshipped breeches-pocket test, and has been found to contain a few grains of utility with a few pounds of error. A few weeks ago this fact was made public in the address of the President of the Society at the twentieth annual meeting. It was not conveyed precisely in that blunt form, or in those few blunt words, but was decently veiled under a proposition to admit a number of unexamined "outsiders." Six hundred or more recognized chemists and druggists were represented as knocking at the door for admission, but not a word was said about that two-thirds of the trade or profession that never has knocked at the door, and probably never will, unless they are welcomed in a more liberal spirit. It is by no means clear, even as regards these six hundred chemists and druggists, that the Society is not more anxious to get them for the sake of their wool, than they are to come within the magic circle of the Society, as at present constituted. One correspondent—a M.P.S.—amongst a dozen who have written to the *Pharmaceutical Journal* on this subject, has boldly traced the movement to jealousy of the New Trade Association. "I am afraid," he says, "that jealousy has something to do with this: the Pharmaceutical Society bidding for patronage against the United Society. This would be very unworthy of our position, and unnecessarily hostile to the United Society."

The proposition which has been made by the Council, and their manner of making it, are remarkable for timidity and weakness. The Society stands confessedly in a failing financial position—there is no question about that,—and twenty years' experience has taught its members what they might have assumed from the first. They want money; money cannot be got without members; members do not come forward for major or minor examinations; and therefore some scheme must be devised to gather in the outsiders wholesale. The proposition of the Council is to admit all "recognised respectable" chemists and druggists who were in business before 1853. What magic there may be in the period before that date it is difficult to perceive, especially as chemistry is one of the most progressive of sciences. Its whole face may be changed in twenty years, and yet the Pharmaceutical Society is an advocate for going backwards. On this principle Faraday would be pushed aside to make way for an older man, who believed in the chemical theory and manipulation of the last century.

If the Pharmaceutical Society will show any real desire to become a practical institution, sufficiently broad in its rules, objects, and regulations to admit and benefit the whole trade, we shall be amongst the first to give it a hearty welcome. Many members of the Society now take up this journal as if they were touching hot pitch; but the day is not far distant when they will admit that it has honestly and vigorously represented their true interests. The time has gone by when any body of intelligent men can really hope to benefit by future special Parliamentary enactments. A little more tolerance of "tradesman"-like views, such as a sensible correspondent ("Opifex") advocates in the *Pharmaceutical Journal;* a thorough revision of the Society's bye-laws, and an expansion of its rules, may still retrieve the failure of the founder's original plan, and save the Institution from decay and ruin. The United Society has only sprung into existence, because two-thirds of the trade are excluded from the advantages of a central organization; and any straight-forward honest attempt on the part of the old Association to meet the new one half way, would be hailed by all sensible chemists and druggists as a hopeful movement. As we were among the first to suggest this scheme to popularise the old Society, we shall be the first to support it; believing it to be as necessary for the true interests of the trade, as it will be effective in restoring financial prosperity to Jacob Bell's Institution.

QUANTITATIVE ANALYSIS.

BY DR. HENRY M. NOAD, F.R.S.

DETERMINATION OF THE DEGREE OF HARDNESS OF NATURAL WATER —CLARK'S PROCESS.

By the term *Hardness*, as applied to a water, we understand that property which it possesses of decomposing soap, and forming therewith an insoluble compound. All natural waters possess this property in a greater or less degree, but practically the hardening constituents are the earthy salts, viz., carbonates of lime and magnesia, sulphate of lime, nitrate of lime, and sulphate of magnesia; the alkaline salts are almost without any effect. Waters which have their origin in chalky soils, where the water charged with carbonic acid percolates through the soil and readily takes up some of those salts, which are otherwise nearly insoluble, are nearly always very hard, and it is important therefore to ascertain how this hardness may be removed, or at any rate lessened in the cheapest and most effectual manner. Now the hardness of a water may be temporary only, or it may be permanent; if the only earthy salts it contains be the carbonates of lime or of magnesia, or both, then its hardness is of the former character, and it may be removed by simply boiling, but if the water contain lime and magnesia only in the form of sulphates or nitrates, it cannot be improved by merely boiling, and its hardness is very difficult to remove; if the water contain earthy salts in the forms of carbonates and sulphates or nitrates, then it will have its hardness lessened by boiling, precisely in proportion to the quantity of earthy carbonates which it contains.

We are indebted to Dr. Clark, Professor of Chemistry in Marischal College, Aberdeen, for a very elegant and simple method of determining the *degree* of hardness of a mineral water. It consists in ascertaining the quantity of a standard solution of soap in spirit required to produce a permanent lather with a given quantity of the water under examination, the result being expressed in degrees of hardness, each of which corresponds to one grain of carbonate of lime in a gallon (=70,000 grs. of distilled water) of water. From the specification of his patent (enrolled 8th September, 1841) we gather the following particulars:—

1. *Preparation of the Soap Test.*—Sixteen grains of pure Iceland spar are dissolved (taking care to avoid loss) in pure hydrochloric acid, the solution is evaporated to dryness in an air bath, the residue is again re-dissolved in water and again evaporated, and these operations are repeated until the solution gives to test paper neither an acid nor an alkaline re-action. The solution is made up by additional distilled water to the bulk of precisely one gallon, it is then called the "standard solution of sixteen degrees of hardness." Good London curd soap is dissolved in proof spirit in the proportion of one ounce avoirdupois for every gallon of the soap solution, and the solution is filtered into a well stoppered phial, capable of holding 2,000 grains of distilled water, 100 test measures, each measure equal to 10 grains of distilled water of the standard solution of sixteen degrees of hardness are introduced; into the water

in this phial the soap solution is gradually poured from a graduated burette; the mixture being well shaken after each addition of the solution of soap, until a lather is formed of sufficient consistence to remain for five minutes all over the surface of the water, when the phial is placed on its side. The number of measures of soap solution is noticed, and the strength of the solution is altered, if necessary, by a further addition of either soap or spirit, until exactly 32 measures of the liquid are required for 100 measures of the water of sixteen degrees of hardness. The experiment is made a second and a third time in order to leave no doubt as to the strength of the soap solution, and then a large quantity of the test may be prepared, for which purpose Dr. Clark recommends to scrape off the soap into shavings, by a straight sharp edge of glass, and to dissolve it by heat in part of the proof spirit, mixing the solution thus formed with the rest of the proof spirit. This standard soap solution, with the burette, mixing bottle, and pipette, for delivering exactly 100 test measures of water, may be obtained of Mr. Griffin, operative chemist, in Bunhill-row.

2. *Process for ascertaining the Hardness of Water.*—Previous to applying the soap test, it is necessary to expel from the water the excess of carbonic acid, that is, the excess over and above what is necessary to form alkaline or earthy bi-carbonates; this excess having the property of slowly decomposing a lather once formed. For this purpose, before measuring out the water for trial, it should be shaken briskly in a stoppered glass bottle half filled with it, sucking out the air from the bottle at intervals by means of a glass tube, so as to change the atmosphere in the bottle; 100 measures of the water are then introduced into the stoppered phial, and treated with the soap test, the carbonic acid eliminated being sucked out from time to time from the upper part of the bottle. The hardness of the water is then inferred directly from the number of measures of soap solution employed, by reference to the subjoined table. In trials of waters above sixteen degrees hardness, 100 measures of distilled water should be added, and sixty measures of the soap test dropped into the mixture, provided a lather is not formed previously. If at sixty test measures of soap test, or at any number of such measures between 32° and 60° the proper lather be produced, then a final trial may be made in the following manner:—100 test measures of the water under trial are mixed with 100 measures of distilled water, well agitated, and the carbonic acid sucked out; to this mixture soap test is added until the lather is produced, the number of test measures required is divided by two, and the double of such degree will be the hardness of the water; for example, suppose half the soap test that has been required correspond to $10\frac{5}{10}$ degrees of hardness, then the hardness of the water under trial will be 21. Suppose, however, that sixty measures of the soap test have failed to produce a lather, then another 100 measures of distilled water are added, and the preliminary trial made, until 90 test measures of soap solution have been added; should a lather now be produced, a final trial is made by adding to 100 test measures of the acid to be tried 200 test measures of distilled water, and the quantity of soap test required is divided by three, and the degree of hardness corresponding with the third part being ascertained by comparison with the standard solutions, this degree multiplied by three will be the hardness of the water. Thus, suppose 84·5 measures of soap solution were required, $\frac{84\cdot5}{3} = 28\cdot5$, and, on referring to the table, this number is found to correspond to 14°, which, multiplied by three, gives 42° for the actual hardness of the water.

TABLE OF SOAP-TEST MEASURES, CORRESPONDING TO ONE HUNDRED TEST MEASURES OF EACH STANDARD SOLUTION.

Degree of Hardness.		Soap-test Measures.	Differences as for the next degree of Hardness.
0	(distilled water)..	1·4	1·8
1		3·2	2·2
2		5·4	2·2
3		7·6	2·0
4		9·6	2·0
5		11·6	2·0
6		13·6	2·0
7		15·6	1·9
8		17·5	1·9

Degree of Hardness.	Soap-test Measures.	Differences as for the next degree of Hardness.
9	19·4	1·9
10	21·3	1·8
11	23·1	1·8
12	24·9	1·8
13	26·7	1·8
14	28·5	1·8
16	30·3	1·7
16	32·0	

When the measures of soap-test necessary to form a lather with one hundred test measures of a water exactly correspond with a standard solution, then the degree of hardness will be the corresponding integral number found in the first column. Thus—24·9 of soap-test will indicate 12° of hardness, 26·7 of soap-test will indicate 13° of hardness, and so on. But if the measures of soap-test do not exactly correspond with a number in the first column, the hardness will be expressed partly by an integer and partly by a fraction. The *integer* will be the hardness corresponding to the next lower number in the soap-test column. The *numerator* of the fraction will be the excess of the soap-test measures in question above this number. The *denominator* of the fraction will be the corresponding difference which follows the soap-test in the next column.

Example.—Let 25·8 be the measures of soap-test required by one hundred test measures of a given water; 24·9 is the next lower number in the soap-test column; therefore 12° of hardness, the corresponding degree, is the integral part of the required hardness. The numerator of the fraction is 25·8—24·9 = 0·9; the denominator is the corresponding difference = 1·8. Therefore the *fraction* is $\frac{0{\cdot}9}{1{\cdot}8} = 0{\cdot}5$, and the whole hardness is 12·5°.

To infer the degree of hardness from an ordinary analysis, Dr. Clarke gives the following rule:—"Compute the grains of lime, magnesia, oxides of iron, and alumina in a gallon of water each, into its equivalent of chalk; the sum of those equivalents will be the hardness of the water." The experiments of Mr. Campbell, however, with which my own agree generally, show that this rule is not always accurate. He found that water containing sulphate of *magnesia alone* acts towards the soap-test in producing with it a perfect lather, similarly, or nearly so, as water containing a *lime* salt alone, *only* when the equivalent of magnesia salt does not exceed six grains of carbonate lime in a gallon of water. From that point the magnesian standards begin not to require so much soap-test as the lime, and as the standards increase this difference in soap-test increases till the magnesian standard of 16° requires only 19·6° soap-tests; whilst the lime standard of 16° requires 32. In standard solutions containing 16°, 12°, 8°, 6°, 4°, 2° lime in a gallon *plus* 1°, 2°, 3° 4° magnesia, and so on up to 16°, *less* soap-test was requisite to cause a perfect lather in most of the solutions, than is requisite or the standard of lime alone contained in them; or, in other words, the magnesia appeared to *soften* the lime standards, and this peculiarity was found to increase as the magnesia increased. For example—A standard of lime of 16° takes 32 test measures, a standard of lime 16° + 1° magnesia takes 31·6, and a standard of lime 16° + 16° magnesia takes 27·9. It thus appears that when a water contains both magnesia and lime salts (the former in quantity), the degree of hardness of the water cannot be taken as representing the amount of the earthy salts present; neither can it be considered as giving the amount of lime. It is rarely, however, that a water applicable to domestic use occurs in which there is such an amount of magnesia present as to occasion serious disturbances in the indications of the soap-test.

Lastly, to obtain uniform results, Dr. Clark recommends that as soon as a lather is formed such as will remain for five minutes, an *interim* note be taken of the quantity of soap-test used. In about half an hour the bottle should be shaken again, to see whether the lather will still remain for five minutes. If the water does not exceed 4° or 5° of hardness, it is likely to require a little more soap-test upon this renewed shaking; but in every case where more soap-test is required, more must be added. This latter quantity and the former will together make up the whole soap-test; that is to determine the hardness of the water. For hours afterwards, unless, perhaps, the water does not exceed 1° or 2° of hardness, a lather lasting for five minutes may be restored by shaking the phial.

PHOTOGRAPHIC CHEMICALS.—VI.

CITRIC ACID.—This organic acid is found in great abundance in lime and lemon juice, and is generally sold in large well formed crystals; it is often adulterated with tartaric acid, which renders it useless for photographic purposes. It should be tested by adding acetate of potash to a saturated solution, when, if tartaric acid is present, tartrate of potash will be thrown down. It is used in developing solutions when the heat of the weather renders acetic acid useless. It is also added to alkaline chloride of gold, in the toning process, being thought to improve the colour of the print.

COLLODION.

Collodion, the most important of photographic products, is a viscid, semi-transparent fluid, formed by dissolving pyroxyline in a mixture of ether and alcohol, to which is added a certain quantity of some soluble iodide or bromide. Pyroxyline is prepared by immersing cotton wool, flax, unsized paper, or some substance composed of lignine, in a mixture of nitric and sulphuric acids. The preparation of good photographic collodion is one of the most difficult processes in the whole range of chemical operations, and one in which the greatest possible intelligence, care, and perseverance must be employed. No one who is not possessed of these qualifications, added to a large stock of patience, should attempt its manufacture. Success generally attends the experimentalist's efforts at first, but this is generally succeeded by a series of the most perplexing failures and difficulties. To understand the reason of this, it will be necessary to go somewhat into the chemistry of pyroxyline and its chemical allies.

In 1833 M. Braconnot discovered that, when starch was submitted to the action of nitric acid it became converted into a peculiar substance, which dissolved in the acid, and was precipitated upon the addition of water. This substance, which was named xyloidine, was found to explode when dry, at a temperature of 356°. The subsequent researches of M. Pelouze proved this substance to be starch, in which one equivalent of hydrogen was replaced by one of peroxide of nitrogen, or, in chemical language,

$$C_{12}\,H_{10}\,O_{10} + NO_5\,HO = \left.\begin{matrix}C_{12}\,H_9\\ NO_4\end{matrix}\right\}O_{10} + 2\,HO.$$

In 1846 M. Schönbein discovered gun cotton or pyroxyline, an explosive material, soluble in ether and alcohol. His method of making it was by immersing cotton in a mixture consisting of one part of nitric acid added to three of sulphuric acid. After being immersed for five minutes, the cotton was washed repeatedly in water, and dried. The sulphuric acid contained in the mixture was simply to absorb the water formed in the process, which would otherwise weaken the nitric acid, and cause it to dissolve the pyroxyline. Chemists soon recognised the analogy of these two compounds, starch and lignine being similar in composition, and cotton fibre being nearly pure lignine. Further research proved that there were three principal varieties of pyroxyline, depending on the strength of the nitro-sulphuric acid used. By employing the strongest mixed acids the most explosive gun-cotton was produced; it contained the largest amount of peroxide of nitrogen, and was only soluble in acetic ether. This was the quality most adapted for blasting operations. The second kind, made with a slightly weaker acid than the last, contained less peroxide of nitrogen, was not so explosive, and dissolved readily in ether and alcohol. The third form, made from still weaker acids, contained still less peroxide of nitrogen, was only combustible. It partly dissolved in the acids from the formation of xyloidine, and was useless to the photographer, from forming an opaque film on drying. Between the first and third of these substances numerous compounds were found to exist, depending on the strength of the acids used, the temperature at which the pyroxyline was made, and the time of immersion. Very few of them were found useful to the photographer. The following experiments, condensed from "Sutton's Positive Collodion Process," will show how an apparently slight difference will materially affect the ultimate value of the pyroxyline made as a photographic agent:—Make a mixture of nitric acid, s. g. 1·5, 5 drachms; sulphuric acid, s. g. 1·84, 5 drachms. Heat in a porcelain pan, by means of a water-bath, to 140°. Immerse in it 25 grains of cotton wool for five minutes, then throw away the acids and wash the cotton. Perform this experiment twelve times, with the same proportions of acid, but adding, each time, 30 additional minims of water. The acid mixture used in the twelfth experiment will contain 5 drachms of each of the acids, and 5½ drachms of water. Calling the pyroxyline made in the first experiment No. 1, that made in the second No. 2, and so on to No. 12, we shall find, on weighing them, that 1, 2, 3 weigh 43 grains each; 4 weighs 42 grains; 5, 6, 7, 8, 37 grains, and the rest somewhat less. If we test their solubility in ether, s. g. ·750, we shall find 1, 2, 3 to be insoluble; 4 seems inclined to dissolve; 5, 6, 7, 8, 9, 10 are perfectly soluble; 11 partly so, and 12 not at all. Nos. 1, 2, 3, 4 are explosive; 5, 6, 7, 8 less so; and the remainder merely combustible. Pour a few drops of the collodion made from 5 on the finger; it dries quickly, is highly contractile, and very hard. From its impermeability, it would be useless in photography. Try the same with 10, and you will find the film to be wanting in contractility, and looking like a piece of opaque tissue paper wrapped round the finger. On trying 8 and 9 you will find the same fault in a less degree. Nos. 6 and 7 are nearly perfect, the latter being somewhat crapy when set, and the former perfectly structureless, apparently leaving nothing to be desired.

It will be readily seen, from the above, that the physical properties of different pyroxylines vary considerably, although their chemical composition is apparently the same; and, furthermore, that out of twelve samples made by varying the proportion of water, only one was really good. The above experiments might have been infinitely varied by altering the original strengths of the acids, by changing their proportions, by raising or lowering the temperature, or by shortening or prolonging the immersion. It will also be perfectly clear that the manufacture of collodion cannot be carried on by rule of thumb alone.

The physical characters to be avoided are glutinosity, crapy structure, horniness, impermeability, too great contractility, and want of adhesiveness to the glass. These bad qualities luckily go together as a general rule. Pyroxyline of a proper quality will give a fluid collodion, and a soft, smooth, porous, adhesive film. Most of these good qualities are gained by using acids of a proper strength, combined with a suitable proportion of water, at a certain temperature. As to chemical qualities, great sensitiveness to light is one characteristic, and the power of giving dense images is another; these are gained by paying proper attention to temperature. If the temperature be raised too high, the resulting collodion will be but moderately sensitive, giving pictures of excessive density, quite useless for printing. If, on the other hand, the temperature is too much lowered, the collodion will be very sensitive, but the image will be too weak and thin. In the experiments just quoted, the dilution of the acids, up to a certain point, was accompanied by an improvement in the physical quality of the pyroxyline. The pyroxyline No. 6, although the best in this respect, would be found to be deficient in forming a sufficiently dense image, remaining inert, and refusing to enter into chemical combination with the silver salts employed. By using the same amount of acids and water, and raising the temperature to 170°, the resulting pyroxyline exerts a decided influence in the formation of an image of proper density. The action of the hotter acid, in rendering the pyroxyline more apt to combine with the silver salts, has not yet been fully made out. It is imagined, with some degree of apparent truth, that the surface of the cotton fibre becomes disintegrated, forming some substance similar to gum or sugar, which behaves with the silver salts in the same way as albumen and gelatine in the paper processes. The collodion just described is as perfect as may be for the negative process, when the image is formed as much as possible *in* the film, but, possessing these characteristics, it is deficient in quality for the positive process, where the image ought to be confined to the surface. The No. 6 collodion, prepared at the low temperature, would therefore possess the qualities of a perfect positive collodion. It will, in fact, be seen further on, that this is, as nearly as possible, the formula that Mr. Sutton gives for such a collodion. It is obvious, from these facts and experiments, that nothing but patient and intelligent practice will ever lead to success in making collodion. Although formulæ of undoubted excellence may be used, it continually happens that the results are entirely nugatory from some trifling cause. The writer was given a formula for making collodion of a peculiar kind for the dry process, but although the directions were strictly adhered to, the cotton always dissolved partially in the acids. Previous experiment pointed out that too much water might be the cause. This was found to be the case, and, after a long investigation, it was discovered that the measure used for the water was wrongly marked. It continually happens, too, that the acids are not of their marked strength. Good hydrometers, carefully tested by the maker, should be employed, and the result verified by the specific gravity bottle. A good thermometer is an indispensable adjunct, a difference of a few degrees making a great alteration in the quality of the pyroxyline.

In giving a sketch of the manufacture of collodion, it will be best to begin by describing the chemicals used, and then the method of preparation.

Cotton.—Cotton is chosen in preference to paper for many reasons. The finely divided condition in which cotton exists is peculiarly favourable to the proper penetration of the acids. It is purer and more constant in chemical composition than other material. The finest quality should be used as being the cleanest; and Mr. Hardwich recommends that it should be boiled for two hours in a solution of caustic potash, 2 ozs. to the gallon, and afterwards repeatedly washed and dried. This is for the purpose of getting rid of a deposition of a resinous nature which surrounds the fibres like a bark and hinders the action of the acids. *A priori,* one would think that cotton so treated would become more liable to dissolve in the acids from being partially disintegrated by the potash; but the direct contrary is the case, for when the cotton is not cleansed, the resinous matter deoxidates the nitric acid, and generally causes the solution of part of the fibre.

The Acids.—The ordinary commercial oil of vitriol, s. g. 1·843, is sufficiently pure for use. It should be kept closely stoppered, or it will absorb water from the atmosphere. The purest nitric acid, s. g. 1·45, should be employed. Many operators use the common yellow acid known in commerce as "acid nitros," from motives of economy; but the pyroxyline made with it becomes modified in some way, from its generally containing a portion of chlorine varying considerably in different samples. The writer has never found pyroxyline, made with the "acid nitros," work so well as that made with the purer quality. It may be reasonably asked why acids are used of so great a strength, seeing that water is added to them afterwards. There are two reasons for this; the strong acids are much more uniform than the weaker ones, and they should be as strong as possible to admit of the use of sufficient water to raise the temperature without employing artificial means.

Ether and Alcohol.—After the pyroxyline the ether is the most important chemical in making collodion; and we are in this instance quite in the hands of the manufacturer. It is most difficult to procure a sample of ether which does not contain a certain ozonised principle which liberates the iodine from iodide of potassium. Good ether of ·725, mixed with an equal bulk of strong alcohol containing 3½ grains of iodide of potassium to the ounce, should remain colourless for several days in a cool place. Ordinary ether generally strikes a yellow colour within half an hour after this test is applied. To procure ether perfectly pure and free from this pernicious principle, Mr. Hardwich recommends the following process: "Take the best washed ether of commerce and agitate it thoroughly with a small portion of dilute sulphuric acid, and then introduce it into a retort and distil over one-third." Ether thus treated has a s. g. of ·722 to ·725, and has a distinct alkaline reaction. The distillation of ether is an operation attended with the greatest danger, and should never be attempted without taking the utmost precaution that the vapour, which is very heavy, does not reach the source of heat. A water bath, heated by an iron heater, is an excellent form of apparatus for this purpose; as ether boils at 96°, a very gentle heat is sufficient. These precautionary remarks apply also to alcohol, although not in so great a measure as to ether. The ozonised principle mentioned above is formed in ether by the combined action of light and air. Bottles containing ether should, therefore, be kept quite full and in a dark place. This also applies to collodion. It is particularly to be observed that ordinary rectified spirit is quite useless for preparing collodion. Not only does it contain certain organic principles of an oily nature, but also a large quantity of water, which would render the collodion made from it rotten and powdery. The purity of alcohol is of much more consequence than its strength. As has been remarked before, absolute alcohol is useless in photography. A spirit containing four per cent. of water may be made by agitating commercial spirits of wine with carbonate of potash in the proportion of one part of salt to eight or ten of spirit. The bottle should be well shaken at intervals for two or three days, and the carbonate of potash, which is a deliquescent salt, forms an oily liquid with the water contained in the spirit. This sinks to the bottom, and the supernatant spiri is drawn off carefully. This should be repeated several times with fresh carbonate until he powdered salt is no longer wetted. The concentrated spirit is found to possess a s. g. of ·815 to ·823. It is then mixed with dry chloride of calcium in the proportion of three quarters of a pound of salt to half a gallon of spirit, and distilled in a steam-bath. The resulting spirit has a s. g. of ·805, and is of the strength of that sold for absolute alcohol.

Iodising Compounds.—Iodide of potassium is most generally preferred; many use half iodide of cadmium added to it. The addition of bromide of ammonium is often found to favour the cleanliness of the picture, especially in the hands of amateurs. A bromo-iodised collodion may be used with great advantage in hot weather, the danger of solarisation being much lessened by its use. The remarks on the iodides, to be found under their respective heads, contain information as to their various qualities, and the method of making and purifying them.

PREPARATION OF COLLODION.

POSITIVE COLLODION (Hardwich).—*Pyroxyline.*—Take of sulphuric acid, s. g. 1·845, at 60°, 12 fluid ounces; nitric acid, s. g. 1·45, at 60°, 12 fluid ounces; water, 3½ fluid ounces; cotton, 300 grains. Mix, and allow the temperature to fall to 140°.

This nitro-sulphuric acid is somewhat weak; if therefore the cotton is found to dissolve or gelatinise in it, reduce the quantity of water to 3 ounces.

Plain Collodion.—Take of ether, s. g. ·725, 4½ fluid ounces; alcohol, s. g. ·805, 1½ fluid ounces; pyroxyline, 48 grains. Shake up the pyroxyline first with the alcohol, and then add the ether.

Iodising Solution.—Take of iodide of ammonium, 1½ drachms; iodide of cadmium, 1½ drachms; bromide of ammonium, 40 grains; alcohol s. g. ·805 to ·816, 10 fluid ounces. Powder and dissolve.

The collodion is iodised by adding the iodising solution to it, in the proportion of one part to three of collodion. The iodised collodion should be kept for at least six weeks before using. If it is required for immediate use, dissolve five grains of iodine in one ounce of alcohol, and add a few drops of it to the collodion, until it assumes a golden yellow colour. This collodion will keep iodised for many months, with very little loss of sensitiveness.

Mr. Sutton's formula is slightly different.

Pyroxyline.—Take of sulphuric acid s. g. 1·84, 1½ ounces; nitric acid s. g. 1·42, 1½ ounces; cotton, 1 drachm. Mix, and keep the temperature at 150°.

Plain Collodion.—Take of ether s. g. ·750, alcohol s. g. ·820, equal parts; pyroxyline, 6 grains. Dissolve.

The writer has seen some very fine positives taken with this formula.

NEGATIVE COLLODION (Hardwich).—*Pyroxyline.*—Take of sulphuric acid s. g. 1·845, at 60°, 18 fluid ounces; nitric acid s. g. 1·475, at 60°, 6 fluid ounces; water, 5¼ fluid ounces; cotton, 300 grains. Mix, and allow the temperature to fall to 150°. Immerse the cotton in pieces, well pulled out, weighing 30 grains each; this will occupy about two minutes, after which the vessel may be covered up for eight minutes. Take out the pyroxyline with a glass spatula, and squeeze as much acid out of it as possible before throwing it into the water. It must be washed for at least twenty-four hours, squeezed in a cloth, and pulled out to dry. If it tears pretty easily, rather more so than plain cotton, we may be sure the pyroxyline is good. If it is tough and strong, increase the water in the acid mixture; if, on the other hand, it is rotten and small in quantity, the water must be reduced. The weight ought to be 375 grains.

Plain Collodion.—Take of alcohol s. g. ·806, ½ gallon; ether s. g. ·725, 1 gallon; pyroxyline, 1900 grains. Saturate the pyroxyline with the alcohol, then pour in half a gallon of the ether, agitate for three or four minutes, and repeat the process in adding the remainder. The collodion should be allowed to settle for a week or ten days, when the clear fluid should be drawn from the sediment. These practical directions apply equally to positive collodion.

Iodising Solutions.—Formula for Potassium Iodiser.—Iodide of potassium, 135 grains; alcohol ·816, 10 ounces. Powder, and dissolve in the alcohol, previously heated to 140°.

Formula for Cadmium Iodiser.—Iodide of cadmium, 170 grains; alcohol ·816, 10 ounces. Dissolve in the cold, and filter.

Formula for Bromo-iodiser.—Bromide of ammonium, 40 grains; iodide of ammonium, 90 grains; iodide of cadmium, 90 grains; alcohol ·816, 10 ounces. Pulverise, and dissolve in the cold.

To sensitise the collodion, add to three parts one part of either of the above.

THE NATURAL ORDERS OF PLANTS.

Leguminosæ, or Fabaceæ.—The Leguminous, or Bean Order—(*Continued.*)

Sub-Order Cæsalpinieæ.

General Properties.—Purgative properties are the most remarkable feature in this sub-order. Many of the plants contain astringent matter, and several produce edible fruits. Others furnish dye-woods, and some yield excellent timber. "The size of the timber," says Lindley, "is sometimes prodigious. The locust trees of the west have long been celebrated for their gigantic stature, and other species are the colossi of South American forests. Martius represents a scene in Brazil where some trees of this kind occurred of such enormous dimensions that fifteen Indians, with out-stretched arms, could only just embrace one of them. At the bottom they were thirty-four feet in circumference, and sixty feet where the boles became cylindrical. By counting the concentric rings of such parts as were accessible, he arrived at the conclusion that they were of the age of Homer, and three hundred and thirty-two years old in the days of Pythagoras; one estimate, indeed, reduced their antiquity to two thousand and fifty-two years, while another carried it up to four thousand one hundred and four years; from which he argues, that the trees cannot but date far beyond the time of our Saviour." None of the plants of this sub-order possess any very evident poisonous properties.

Principal Plants and Uses.

Aloexylum.—One of the two sorts of Calambac, Eagle-wood, or Lign Aloes, a fragrant substance, more grateful to oriental nations than any other perfume, is the produce of the species *Agallochum*. Loureiro states that it consists of a concretion of the oily particles into a resin in the centre of the trunk; being brought on by some disease of which the tree ultimately dies. It is said to be stimulant, corroborant, cephalic, and cardiac, and its scent is stated to be employed against vertigo and paralysis.

Baphia.—The dye-wood known under the name of Camwood or Barwood, is the produce of the species *Nitida*. It is stated to be employed, in conjunction with sulphate of iron, in the production of the dark red colour of the English Bandana handkerchiefs.

Bauhinia.—Fibres which are employed for the purpose of making ropes are obtained from the species *Parviflora*, *Racemosa*, and *Vahlii*. A brownish coloured gum is said to be produced by the species *Emarginata*, and *Retusa*. The buds and dried flowers of the species *Tomentosa* are said to be employed by the Indian practitioners in dysenteric affections. An astringent bark is yielded by the species *Variegata*, which is used in medicine, and also for dyeing and tanning leather. Various other species are reported to be employed in Brazil for their mucilaginous properties.

Cæsalpinea.—Braziletto-wood, which yields fine red and orange colours, is said to be the produce of the species *Braziliensis*. Brazil-wood, employed for dyeing red, rose colour, and yellow, is stated to be yielded by the species *Crista*. Nicaragua, Lima, or Peach-wood, employed for dyeing red, or peach colour is produced, by the species *Echinata*. The exact species yielding these three dye-woods cannot, however, be said to have been yet determined with certainty. The wood of the species *Echinata* is stated to possess tonic properties. The legumes of the species *Coriaria*, "the Libidibi, or Divi-divi pods," furnish us with one of the most astringent substances known, they are extensively employed for tanning purposes. The roots of the species *Moringa* and *Nuga* are said to be diuretic. An oil is stated to be obtained from the species *Oleosperma*. The legumes of the species *Papai*, termed Pi-pi, are employed for similar purposes to those of the species Coriaria, but are very inferior to them. The Bukkum, Bookum, or Sappan-wood of India, used for dying red, is the produce of the species *Sappan*. The root known as Sappan-root, or yellow-wood, is employed for dyeing yellow.

Cassia.—The seeds of the species *Absus*, are very bitter, and somewhat aromatic and mucilaginous. They are employed in Egypt as a remedy for ophthalmia, under the title of Chichon, or Cismatan. The bark of the species *Auriculata* is stated, by Roxburgh, to be employed in medicine, and for the purposes of tanning and dyeing leather; the flowers are said to be used for dyeing yellow. The pulp of the fruit of the species *Fistula* (*Cathartocarpus Fistula*), possesses purgative properties, and is officinal in our Pharmacopœia. That of the species *Braziliana,* which is probably only a variety of the above, has a larger, longer, and rougher fruit. It is employed in veterinary medicine, under the title of Horse Cassia, and possesses similar properties. The several kinds of senna met with in commerce consist of the leaflets of various species, but the exact species yielding some of them cannot at present be said to have been accurately determined. The species *Officinalis* var. *Lanceolata,* and the species *Obovata,* are generally considered to be the source of the Alexandrian senna. The common East Indian, Mecca, or Bombay Senna, is considered by Royle to be the produce of the species *Officinalis,* var. *Acutifolia.* Pereira attributes it to the species *Elongata* of Lemaire; while Forskäl states it to be from the species *Lanceolata* of Forskäl and Lindley. Tinnevelly senna is said to be furnished by the species *Officinalis* var. *Elongata.* —(*C. Lanceolata* of Royle.) These are the three kinds which are officinal in our Pharmacopœias, and are generally employed in this country. Alexandrian senna is frequently adulterated with the leaves of *Solenostemma* (*Cynanchum*) *Argel.* Nat. Ord. Asclepiadaceæ. The Asclepias, or Milkweed order—*Tephrosia Apollinea.* Nat. Ord. Leguminosæ, &c. These sophistications may at once be detected by the leaflets being *equal* sided at their base, whereas the sennas are all *unequal.* Tripoli senna is stated to be the produce of the species *Œthiopica.* American of the species *Marilandica,* and Aleppo of *Obovata.*

CERATONIA.—The fruit of the species *Siliqua,* known as Carob, Locust, Algaroba-bean, St. John's bread, possesses a sweet nutritious pulp, supposed by some to have been the food of St. John in the Wilderness. It is said to be used in the South of Spain as a food for horses, and is now imported into this country as a food for cattle. Singers are said to chew it for the purpose of improving their voice. The seeds are stated to have been the original carat weights of the jewellers.

CODARIUM.—The fruit of two species *Acutifolium,* and *Obtusifolium,* known as Brown and Velvet Tamarinds in Sierra Leone, have an agreeable pulp, which is eaten.

COPAIFERA.—Several species of this genus, if not all, furnish the oleo-resin, known as Balsam of Copaiba, the quality of which probably varies with the species. Among the principal species are probably *Coriacea, Langsdorfii, Multijuga, Officinalis,* &c. The species *Bracteata,* and *Pubiflora,* furnish the Purple-heart or Purple-wood of Guiana, which is largely employed for mortar beds, and the manufacture of musket ramrods.

DIALIUM.—The species *Indicum* yields a fruit having a delicate agreeable pulp, less acid than that of the tamarind. It is termed the Tamarind Plum.

EPERUA.—The species *Falcata,* is the Wallaba tree of Guiana, which, according to Sir R. Schomburghk, yields a very durable wood, of a deep red colour, frequently variegated with whitish streaks. The bark is bitter, and is stated to be used by the Arawaak Indians as an emetic.

GLEDITSCHIA.—The species *Triacantha,* yields a fruit similar to that of the Ceratonia Siliqua. In North America it is termed the Honey Locust.

GUILANDINA.—The species *Bonduc,* or Nicker tree, yields a bitter tonic bark. The seeds are very bitter, emetic and tonic, and the leaves are stated to possess discutient properties.

HÆMATOXYLON.—The species *Campechianum* yields the wood commonly known as Logwood, employed in medicine as an astringent and tonic, and also for dyeing, and other purposes. It contains two crystalline colouring principles, hæmatin and hæmatoxylin.

HYMENŒA.—The species *Courbaril,* West Indian Locust tree, is supposed to yield Gum Anime, or East Indian Copal. The inner bark is stated to possess anthelmintic properties. The fruit contains a mealy substance, in which the seeds are imbedded, which is sweet and pleasant; when boiled and allowed to ferment it is said to form an intoxicating drink, resembling beer. The timber is close grained and tough, and is employed by ship carpenters for planking vessels, &c. The species *Verrucosa,* probably yields some of the East Indian Copal. A species of this genus probably yields Mexican Copal. Brazilian Copal is thought to be furnished by several species of this genus, and by *Trachylobium Martianum,* a plant belonging to the same sub-order. Several species of the genus, together with *Guibourtia Copallifera,* are probably the source of the substances known as African Copal, African yellow gum, and African red gum.

MORA.—The wood of the species *Excelsa,* a large tree, a native of Guiana, is largely employed for ship building, under the name of Mora-wood.

PARKINSONIA.—The stems of the species *Aculeata* furnish useful fibres.

POINCIANA.—The leaves of the species *Pulcherrima* are stated to possess purgativ properties, and the roots are said to be tonic.

SWARTZIA.—A powerful sudorific, known as Panococco bark, is obtained from the specie *Tomentoso*, the wood is stated to be very hard and intensely bitter. The seeds of the species *Triphylla* are stated to be excessively acrid.

TAMARINDUS.—The fruit of the species *Indica* constitutes the well-known Tamarind, which, when preserved with sugar, forms a very agreeable confection. The pulp is acidulous, sweet, and agreeable, and is an officinal article in the Materia Medica of our Pharmacopœia. It is employed in the preparation of a cooling laxative drink.

SUB-ORDER MIMOSEÆ.

GENERAL PROPERTIES.—The production of gum, and the presence of astringent principles, are the chief characteristics. Some possess emetic qualities, a few are stated to be purgative, and a small number are reputed to be poisonous.

PRINCIPAL PLANTS AND USES.

ACACIA.—The various varieties of gum are obtained from this genus. Gum Arabic is principally obtained from the species *Vera*, and *Nilotica*, of Delile. The species *Arabica*, and *Speciosa*, yield East Indian gum. The species *Affinis*, *Decurrens*, and *Mollissima*, South Australian. The species *Karoo*, Cape; and the species *Adansonii*, *Seyal*, *Vera*, *Verek*, &c., Gum Senegal. The gum of one of the species is stated to constitute an important article of food to the natives of the Swann River. The wood of the species *Arabica* is employed in India for making wheels and tent pegs, and its bark is reputed a powerful tonic, and, together with that of the species *Catechu*, is extensively used under the name of Babool. The powerful astringent substance, known as Cutch, or Catechu, is an extract obtained from the duramen or heart-wood of the species *Catechu*. It is largely employed for dyeing and tanning, and constitutes one of the officinal substances of our Pharmacopœia. The flowers of the species *Farnesiana* are very fragrant, and yield, by distillation, a delicious perfume, to which powerful virtues have been ascribed, The wood employed in the construction of the stairs of the Crystal Palace in Hyde Park, at the Great Exhibition of 1851, and which, on its removal, was found to be but little worn, was the produce of the species *Formosa*, a native of Cuba. It is very hard, tough, and durable, of a dull red colour, and termed Sabicu. An intoxicating liquor is said to be prepared in India by distilling the bark of the species *Ferruginea*, and *Leucophæa*, with jagghery water. The bark of the species *Melanoxylon*, a native of Australia, is sometimes imported under the name of Acacia bark. An extract of the bark, very valuable for tanning, is frequently imported. Another astringent product for tanning purposes is that imported under the names of Neb-neb, Nib-nib, or Bablah, it consists of the dried legumes or pods of the species *Nilotica*. The species *Seyal* is probably the Shittah-tree, or Shittim-wood, of the Bible. The species *Varians* is said to be poisonous. Several species are much prized in our gardens for the beauty of their blossom and foliage.

ADENANTHERA.—A dye-wood is yielded by the species *Pavonia*, called in India Ruktachundun, or Red Sandal-wood. (This must not be confounded with that produced by the Pterocarpus Santalinus, described in our June number.)* The seeds are of a bright red colour, and perfectly smooth, and are said to be employed, under the name of Barricarri seeds, in the Northern parts of South America for making necklaces, &c.

ENTADA.—According to Horsfield, the species *Pursætha*, of Java, is emetic. The large brown beans are termed Gela, and are used by the natives for washing their hair.

ERYTHOPHLŒUM.—The species Guineense is the Sassy tree of Western Africa. It is used in certain parts of Africa under the name of Ordeal bark, or Doom bark, as a supposed test of the innocence or guilt of persons suspected of great crimes, as secret murder, &c.

INGA.—The pods of the species *Fæculifera*, or Poix doux, of St. Domingo, contain a sweet pulp, having purgative properties, which is used by the natives; similar qualities are stated to reside in the pulp of the pods of the species *Vera*, and that of *Tetraphylla*, is sweet and mucilaginous. The species *Vera* possesses astringent properties.

MIMOSA.—The root of one of the Brazilian species is stated to possess poisonous properties.

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* Page 174.

The roots of the species *Sensitiva* are said to evolve a most unpleasant odour, resembling that emitted from sewers in time of impending rain.

PARKIA.—The seeds of the species *Africana* are stated to be roasted in the same manner as coffee, bruised, and allowed to ferment in water; when they begin to become putrid, they are well washed, pounded, and made into cakes in a similiar fashion to chocolate. They are stated to be an excellent sauce for all kinds of meat. A pleasant drink is formed from the farinaceous matter surrounding the seeds, and a sweetmeat is also made from it.

PROSOPIS.—A drink called Chica, much used in South America, is prepared from the pods of the species *Algaroba*. It is stated "that old women are employed to chew these Algarobas, and the Schinus, and then to spit them into a vessel," water is added, and the mixture fermented. Some of the Algarobas of the western part of South America are said to yield fruit, the pericarp of which consists almost entirely of Tannin. The leaves and branches of the species *Iuliflora* are stated to prove poisonous to cattle.

THE PHARMACY OF LOBELIA.

(COMMUNICATED BY EDWARD PARRISH, OF PHILADELPHIA.)

IN the May number of the *Chemist and Druggist* appeared a notice of *Lobelia Inflata*, which seems rather incomplete without some further observations directed especially to the pharmaceutical characteristics of this favourite American remedy. Commerce is chiefly supplied with American indigenous herbs by the sect of "United Brethren," or "Shakers," who have several settlements in this country; the largest of which is New Lebanon, beautifully located in a picturesque and fertile valley in the eastern part of the State of New York, where, practising their peculiar celibacy connected with daily social intercourse of the sexes, and maintaining a complete seclusion from the world around them, this industrious and money-making sect cultivate immense quantities of useful herbs, which are carefully dried, pressed into small bulk, and distributed over the country.

As thus obtained, Lobelia consists of comminuted leaves and stems of a rather pale green colour, mixed with numerous characteristic small inflated capsules, and occasionally blue flowers; it has a slight irritating odour, no taste at first, but upon chewing produces a powerful acrid impression and copious flow of saliva, similar to the effect of tobacco, which, in fact, it resembles in medical properties.

The seeds are sold separately, both whole and in powder; they are very small, almond-shaped, with reticulated ridges and furrows; very distinct under a glass, and rather characteristic; they are very much more powerful than the leaves, containing, at least, twice as much *Lobelina*.

Lobelia (the herb) is given in powder, as an emetic, in doses of from five to thirty grains; though administered so freely in Thomsonian practice, full doses are not considered safe by prudent practitioners, unless Emesis be certainly induced: extreme prostration, convulsions, and death have resulted from too large or frequently repeated doses. In the form of tincture it is officinal in all the British as well as in our own Pharmacopœias. The emetic dose of this preparation is a half fluid ounce, which, however, is a maximum quantity equivalent to thirty grains of the powder; a fluid drachm, or even less, is commonly employed in asthmatic and febrile affections. An ethereal tincture is prescribed by the London and Edinburgh Pharmacopœias, but has not found favour on this side the Atlantic: the use of ether in this preparation is probably due to its known solvent action upon Loblina; but there seems to be no practical difficulty in extracting this effectually with the less volatile menstruum used in the common tincture. It is only when evaporation is resorted to, as in making the extract and fluid extract, that we need any addition to the diluted alcohol; and in this case acetic acid, which fixes the Lobelina into a more permanent acetate, is preferred.

Professor Procter's recipe for *acetic extract* of Lobelia leaves nothing to be desired: it directs the use of the powdered *seed*, which are to be percolated with diluted alcohol; to the first portion of which is to be added a little acetic acid, and the acetated tincture thus obtained is to be carefully evaporated to the consistence of an extract; the yield is about one-eighth the quantity of the seed employed, and the dose may be from one to three grains. The form of extracts presents advantages for the convenient combination of this remedy with others in pills, which make it a useful addition to the other pharmaceutical preparations of Lobelia. *Acetum Lobeliæ* is a convenient liquid form for administering it, which may be made after the manner of Acetum Scillæ; but of all the "Galenical" solutions the *fluid extracts* now bear the palm, and accordingly the following formula is highly approved, and will probably obtain a place in the forthcoming Pharmacopœia of the United States :—

Fluid Extract of Lobelia.

"Take of Lobelia (the plant) finely bruised	Eight ounces.
Acetic acid	One fluid ounce.
Diluted alcohol	Three pints.
Alcohol	Six fluid ounces.

Macerate the Lobelia in a pint and a half of the diluted alcohol previously mixed with the acetic acid for twenty-four hours; introduce the mixture into a displacer; pour on slowly the remainder of the diluted alcohol, and afterwards water until three pints of tincture are obtained; evaporate this in a water bath to ten fluid ounces; strain; add the alcohol, and, when mixed, filter through paper. Each teaspoonful of this preparation is equal to half a fluid ounce of the tincture. The dose would vary from five drops as a narcotic and expectorant to twenty or thirty as an emetic."

In transcribing this formula of Professor Procter, I have followed the original directions of its author; but the modified process of percolation proposed by Professor J. Grahame is more satisfactory in its results, and less disagreeable to carry out. A pretty fine powder being prepared, should be only slightly moistened, and immediately packed tightly in a funnel, the liquid then being poured on will pass slowly, but highly charged with the soluble principles of the herb, and much less of the menstruum will be required, and the evaporation will be correspondingly shortened.

After occupying so much space I shall only trespass further to remark upon the increased use in modern practice of remedies primarily affecting the nervous system and brain in preference to the lancet, calomels, and cathartics, which were the main reliance of many of the old school; and it is surely commendable that modern pharmacy should set about furnishing such remedies as Lobelia, now happily wrested from empyrics and placed among the legitimate materia medica, in forms adapted to every requirement of the physician.

THE NEW DYES OBTAINED FROM COAL TAR.—II.

BY EMERSON J. REYNOLDS.*

If we regard benzole as the hydride of the organic radical phenyl, the explanation of the reaction which takes place in making nitro-benzole is very simple, consisting in the substitution of an equivalent of hyponitrous acid, for an atom of hydrogen in the benzole, thus :—

$$C_{12} H_5 H + NO_5 = C_{12} H_5 NO_4 + HO.$$

We now come to the third and last stage in the process, namely, the transformation of nitro-benzole into aniline. Various methods have been proposed for effecting this object; but I will now only describe two of them, being those with which I have obtained the best results; they are as follows :—

First.—By means of sulphide of ammonium. This consists in saturating an alcoholic solution of nitro-benzole, first with ammoniacal gas, and afterwards with sulphuretted hydrogen. The liquor is now allowed to remain for twenty-four hours and then heated, when some sulphur will be found to have separated. On decanting from these crystals, the liquor must again be treated with sulphuretted hydrogen, and again distilled or heated. This process must be continued, if need be, re-saturating with the gas until a heavy oily matter deposits: this is the aniline, which requires to be separated from the accompanying fluid and distilled by itself. When so treated, it is obtained nearly pure.

Second.—By means of acetic acid and iron filings. This is what is generally known as Beschamp's process, and although not so elegant in theory, is more satisfactory and less troublesome in practice. It is as follows :—

One part of nitro-benzole, one part of concentrated acetic acid, and two parts of iron filings, are mixed in a capacious retort; after a few minutes the reaction commences without the aid of external heat; the vapours which are condensed consist of aniline, acetate of aniline, together with some unaltered nitro-benzole; these are to be returned to the retort, and the mixture distilled to dryness. The distillate is now treated with potassa fusa, when the aniline separates as an oily layer, which must be removed and distilled once more.

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* See page 119.

The whole object of these processes is to supply hydrogen in the nascent form to the nitro-benzole; the reaction which takes place is simply this:—

$$C_{12}\,H_5\,NO_4 + 6\,H = \underbrace{C_{12}\,H_7\,N}_{\text{Aniline.}} + 4\,HO.$$

The relation which exists between these three bodies may be seen at a glance from the following:—

Benzole, $C_{12}\,H_5\,H$. Nitro-benzole, $C_{12}\,H_5\,NO_4$. Aniline, $C_{12}\,H_7\,N$.

The last source which I will notice is that from indigo: this is not by any means a profitable method of preparing aniline, but I mention it because it is interesting as being the original substance from which this base was prepared; first by Unverdorben, and later by Fritsche.

Indigo, when powdered, is added gradually to a highly concentrated boiling solution of caustic potash contained in a retort, hydrogen gas is evolved, carbonate of potash remains in the retort, and aniline distils over in oily drops. This, on a second distillation, yields nearly pure aniline.

The formation of aniline from indigo is represented by the following equation:—

$$\underbrace{C_{16}\,H_5\,NO_2}_{\text{Indigo.}} + 4\,(KO, HO) + 2\,HO = \underbrace{C_{12}\,H_7\,N}_{\text{Aniline.}} + 4\,(KO, CO_2) + 4\,H.$$

Aniline, $C_{12}\,H_7\,N$, has the following properties:—When pure, it is a colourless liquid, having an aromatic odour, and an acrid, burning taste. It is slightly soluble in water, and very soluble in alcohol and ether. Its sp. gr. = 1·028: at —20° it does not freeze. It is very volatile, but nevertheless has a high boiling point, 359° F. It is a powerful base, combining with acids to form salts, which are in general soluble.

The alkaline hypochlorites colour aniline a violet blue, which passes rapidly to a pale red, especially in contact with acids. Chromic acid, also, reacts in nearly the same way with this substance, aqueous solutions giving a green, blue, or black precipitate, according to the degree of concentration of the liquors. I will now describe the mode of preparation of some of the numerous and beautiful colouring matters obtained by the action of various salts on aniline.

The first of these dyes that I will mention is *Mauve*. It is prepared as follows:—A cold solution of aniline in sulphuric acid is mixed with a solution of bichromate of potash, likewise cold; after about twelve hours a black precipitate will be found to have been formed. This is the colouring matter in an impure state. It is now collected, washed, and dried; then digested in naphtha to dissolve a tarry body with which it is contaminated. The residue, insoluble in naphtha, is dissolved in alcohol; the spirit is then distilled off, and the residue is the pure mauve. The best way to dye a lilac or purple with this substance is as follows:—An alcoholic solution of the colouring matter is to be added to a boiling dilute solution of oxalic and tartaric acids; and when the mixture has cooled down, the materials to be dyed are immersed in the bath, where they must remain for some time. There is one very valuable property which all these new colouring matters possess, and that is, they are what are called substantive colours; in other words, they combine directly with silk or wool, but cotton requires a mordant. There are a great many shades of mauve, from a fine purple to slate colour almost. This is caused by slight variations in the details of the process; thus, by using a very small quantity of hydrochloric acid with the mixture of sulphate of aniline and bichromate of potash, the precipitate will have a reddish tint; on adding more acid, it will be violet; and by still further increasing the quantity of acid, a fine blue will be formed.

There is a very easy and rapid way by means of which the production of this blue dye can be shown; it is as follows:—Take a solution of aniline in hydrochloric acid, containing excess of acid; to this add solution of chloride of sodium, when the colour will be formed immediately; when the desired tint has been obtained, pour in solution of carbonate of potash, which will neutralise the free acid and precipitate the mauve. If the alkaline carbonate were not added, the consequence would be that free chlorine would be disengaged, and the colour bleached.

Purple dyes of different shades are also obtained by the action of peroxide of lead and sulphuric acid in varying proportions.

The colour most remarkable for beauty and delicacy of shade is unquestionably *Fuschine.* It is prepared in the following way:—Dry aniline is raised to its boiling point; when in this state, powdered chloride of mercury (corrosive sublimate) is added in small portions at a time, the liquid first becomes brown, but very soon a rich violet red colour appears; this is the dye. Water is now added, and the whole heated to ebullition. It is then removed from the fire, allowed to rest a moment for some insoluble matters to subside, and then filtered while hot. The filtered liquor contains the colouring matter dissolved. To separate it, advantage is taken of its being insoluble in a saline solution; accordingly, chloride of sodium in a solid state is added to the liquor, and as the salt dissolves the dye is precipitated. Fuschine may be employed for dyeing either in aqueous solution without a mordant, or with the ordinary saline or acid mordants, with the exception of the mineral acids, which alter the colour.

Magenta is almost identical with fuschine.

Azeleine is a splendid red colour, and is more difficult to make really well than any of the others. It is prepared as follows:—Ten parts of aniline are heated on a water bath up to about 260° F.; when this temperature is reached, seven parts of nitrate of mercury dry and in powder are dropped in by degrees. It must remain at 260° for eight or nine hours, when the mass will be found to have changed to a beautiful red colour. This only requires to be dissolved in alcohol and water, and used for dying.

Only very recently a patent has been taken out for producing a green colour called *Emeraldine.* This is done by first soaking the cloth in a solution of chlorate of potash. The goods, after steeping, are to be dried, and then padded or printed with an acid salt of aniline. This is the only instance at present known, in which the base is converted into the colouring matter *in* the tissue itself.

When ribbons have been dyed with these and other colours, a beautiful gloss is imparted to them by the application of albumen in the form of white of egg; thus absorbing a large portion of the eggs coming into the markets, and consequently raising their price very considerably; a cheap substitute for these is at present a desideratum amongst dyers. Recently these purple and red dyes have been used as inks, but from the comparative instability of the colour, we could hardly expect they would ever supersede our ordinary red inks, bad as they are.

I have lately been trying some experiments with fuschine as to its capabilities as a paint, but I am afraid that for the same reason, as with the inks, it is not likely, at least at present, that it could be used in preference to carmine, or any of the other red colours known to painters.

When speaking of nitro-benzole, I mentioned that when this substance is acted on by nitric and sulphuric acids, bi-nitro-benzole is formed. This compound is possessed of great scientific interest, as being the source from which is obtained a very complex series of organic bases. This bi-nitro-benzole, when treated with sulphide of ammonium, yields a substance called nitraniline, containing $C_{12}H_6N_2O_4$. But there is a second compound, in which two equivalents of hydrogen are replaced by two molecules of nitrous acid—this is called dinitraniline. Now, by the prolonged action of sulphide of ammonium on these two substances, two new bases are formed, called, respectively, azophenylamine and nitrazophenylamine. The latter is particularly interesting for this reason; fuschine as prepared by means of bichloride of mercury, appears to be the hydrochlorate of a base, the properties of whose salts are remarkably analogous to those of the salts of the nitrazophenylamine. The crystallized salts of these bases showing the same coloured reflections, and are likewise decomposed (in part, at least), by water and alcohol. The results of the analysis of these red dyes have been so discordant, that it is impossible to offer any opinion as to their true composition. However, the analyses of mauve have been more successful. According to to Monsieur Wilm, this substance appears to be the result of the action of six atoms of oxygen on three molecules of aniline, and leads to the somewhat complex formula $C_{36}H_{17}N_3O_2$.

For several of the facts contained in this paper I am indebted to the valuable communications of M. Kopp.

I have now, in as short and general terms as the somewhat complex nature of the subject admitted, traced the history of aniline, and detailed some of the numerous and beautiful products which it is capable of yielding.

Mauve and Magenta have now become household words amongst us, and I think nothing can show more clearly than these very dyes, the vast importance of chemical science even in a commercial point of view, which it is hardly a paradox to say, can convert coal into gold, and draw forth, as it were, each after each, materials for giving employment to industry, adding ornament to beauty, and even of affording us the illuminating power by which we can look at and admire both.

CHEMICAL NOTES.

Ozone as a bleaching agent.—In *Liebig's Annalen* for May we find the following simple method recommended for restoring the colour of old, spotted, and soiled books and prints :—"Ozonize the air in a sulphuric acid carboy, which is done by placing in it a piece of phosphorus three inches long and half an inch thick, and pouring on it as much water at about 86° Fahrenheit as will half cover the phosphorus. The carboy is loosely corked and allowed to stand in a moderately warm place until the air is charged with ozone, which generally requires from twelve to eighteen hours. Without removing the phosphorus and water, the article to be bleached is uniformly moistened with distilled water, and after being rolled up, is suspended by a platinum wire in about the centre of the carboy. The roll is soon seen to be surrounded continually by the columns of vapour rising from the surface of the phosphorus. The time required for the bleaching depends on the nature of the substance, but it is never more than three days; paper, brown with age and coloured with coffee spots, in two days becomes white and clean. When removed from the carboy, it should be rinsed first in repeated baths of distilled water, then immersed in a very dilute solution of soda, then again washed in distilled water, and finally dried between folds of blotting paper. Unfortunately this process does not succeed so well with oil colours.

Augendre's White Gunpowder.—It is composed of ferrocyanide of potassium, chlorate of potash, and sugar, in the following proportions :—

Ferrocyanide of potassium	28
Chlorate of potash	23
Sugar	49
	100

Its density, as compared with ordinary black gunpowder, is as 0·774 to 1, and the work it performs, taking equal volumes, is as 1·292 to 1. In order to produce the same effect on projectiles in firing mines, &c., 60 parts of white would be required for 100 parts of black, the weights of the residues being respectively 31·53 and 68 parts. Another advantage is stated to consist in the lower temperature produced by the flame of the white gunpowder, so that a greater number of shots could be fired without heating the piece too much. It is, moreover, cheaper, easier to prepare, less liable to change by keeping, and more difficult to explode by pressure and percussion. Should this new powder be found not to attack fire-arms, a large quantity of it may be prepared in a few hours if the materials are at hand, with no other apparatus than a stamping mill and a mixing tube. The products of the decomposition of white gunpowder are assumed to be cyanide of potassium, chloride of potassium, bicarbide of iron, nitrogen, carbonic oxide, carbonic acid, and aqueous vapour, 100 parts yielding 52·56 parts of non-volatile and 47·46 of volatile substances.

Another new Alkali Metal.—Whilst investigating the new metal *cæsium*, Bunsen has lately discovered another metal, which seems to resemble potassium as closely as cæsium does. It has a very high atomic weight, its hydrate is deliquescent and highly caustic, its carbonate is strongly alkaline, and its nitrate anhydrous like nitrate of potassa, but, unlike that salt, its crystalline form is hexagonal. It was obtained from the saline residue from 44,000 kilogrammes of Dürckheim water, and subsequently from *lepidolite.*

Presence of Sugar in Healthy Urine.—Dr. Bence Jones has confirmed the statement of Brücke that sugar exists in this secretion in its normal state. With the assistance of Drs.

Ulrick and Valentine, he has submitted the different processes for detecting and estimating sugar to a close examination. Lehmann's method—according to which the urine is evaporated to dryness, the residue extracted with alcohol, the sugar precipitated by alcoholic solution of potash, then re-dissolved in water, and the copper test applied—was not found to be sufficiently delicate, much sugar being lost during the evaporation. The *fermentation* test (production of carbonic acid and alcohol by yeast) was stopped when much urea or oxalate of urea was present: half a grain of sugar in water could be detected by the alcohol produced, and could be approximatively determined by the carbonic acid given off; but in concentrated urine much larger quantities may be entirely overlooked. In decolorizing the urine previous to using Soleil's saccharimeter sugar is always lost, whether animal charcoal or basic acetate of lead and ammonia be employed as the decolorizing agent. Pettenkofer's test is pronounced the most delicate known. The urine is mixed with a few drops of a concentrated solution of glychocholic acid* in soda or cholacic acid; three or four drops of concentrated sulphuric acid are then added, and the whole gently heated without boiling. If sugar is present a purple colour is seen at the edge of the watch glass, which is more evident on a white ground. The reaction is not hindered by a little colouring matter, but if the urine contains much it must be removed. Trommer's test failed with $\frac{1}{200}$ of a grain of sugar with 1 grain of hydrochlorate of ammonia; and $\frac{4}{1000}$ of a grain of sugar with 1 grain of urea stopped reduction. The best way of applying Trommer's test is the following, recommended by Lehmann:—Two or three cubic centimetres of the urine are mixed with a few drops of solution of potash, and filtered; then an equal quantity of strong potash is added, with about three drops of solution of sulphate of copper; the whole is well shaken, and the clear liquor poured off from the hydrated oxide of copper which has not dissolved. If the blue solution when heated becomes colourless without depositing suboxide of copper, then two drops more of the sulphate of copper should be added, and the experiment repeated. A separation of suboxide is often thus obtained, but long boiling must be avoided, as sugar is thereby decomposed. But the best results were obobtained by Brücke's lead process, according to which the urine is precipitated with neutral acetate of lead, and then with basic acetate of lead, and after filtering off the precipitate ammonia is added; in this last precipitate the chief part of the sugar is found. The authors were able by this process to detect $\frac{1}{7}$ of a grain of sugar in 200 cubic centimetres of urine, and $\frac{2}{3}$ of all the sugar added was recovered; moreover, when sulphuretted hydrogen was used to decompose the ammonia precipitate the sugar could be obtained in a state fit for fermentation, and free from colour, so that the saccharimeter could be employed. For the quantitative estimation of the sugar Fehlings' standard copper solution was employed as the most useful and most accurate. This solution is thus prepared:—Dissolve 69 grains of crystallized sulphate of copper in five times their weight of distilled water, and add to it, first, a concentrated solution of 268 grains of tartrate of potash, and then a solution of 80 grains of hydrate of soda in one ounce of distilled water. Put the solution into an alkalimeter tube, and add distilled water so as to make 1,000 grain measures of the liquor. Every 100 grain measures of the solution are equivalent to one grain of grape sugar.

Combustion in Rarefied Air.—Some interesting experiments on this subject have recently been made by Dr. Frankland. Stearine candles burnt on the summit of Mont Blanc and at Chamounix lost the same weight in the same time, thus proving that the rate of combustion is entirely independent of the density of the air, but the *light* emitted was very sensibly less at the top of the mountain; the lower and blue portion of the flame which, under ordinary circumstances, scarcely rises to within a quarter of an inch of the apex of the wick, now extended to the height of $\frac{1}{8}$ of an inch above the cotton, thus greatly reducing the size of the luminous portion of the flame; the same effects were obtained when a candles was burnt under the receiver of an air-pump, the air being rarefied to the same extent as on the summit of Mont Blanc. Whence arises this diminution of light? Not from imperfect combustion, for Frankland examined with great care the gases that were passing off from flames burning under various pressures, and found that in all cases the combustion was perfect; neither is the phenomenon to be referred to a diminution of temperature, for although a somewhat lower temperature may be produced by a flame burning in a rarefied atmosphere, this is compensated for by the diminution of the cooling effect of the attenuated atmosphere. The real cause is the admission of atmospheric oxygen into the interior of the flame, caused by the great *mobility* of the particles of air in a rarefied atmosphere. The presence of oxygen in the flame determines at once the combustion of the carbon particles which constitute the source from which the light emanates under ordinary circumstances.

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* This acid constitutes the principal portion of the resinous matter of ox-bile.

REVIEWS

A Manual of Botany; including the Structure, Functions, Classification, Properties, and Uses of Plants. By ROBERT BENTLEY, F.L.S., M.R.C.S.E.; Professor of Botany in King's College, London; Professor of Botany and Materia Medica to the Pharmaceutical Society of Great Britain; Medical Associate of King's College, London. Illustrated by nearly 1200 Woodcuts. London: John Churchill, New Burlington-street. 8vo., pp. 811.

PROFESSOR BENTLEY'S *Manual* is a most valuable addition to the works already published on botanical science, and peculiarly adapted to the requirements of the student, being written in language so plain and simple as to be suited to the comprehension of the merest tyro, while those who have made some progress in the science will find in it much to instruct and interest them.

The illustrations, which reach nearly 1200, are well chosen, and admirably executed by Bagg in the best style of wood-engraving. The first part of the work comprises Organography, or Structural and Morphological Botany; and treats of the elementary structure of plants, their organs of nutrition, or vegetation and reproduction; and the theoretical structure, or general morphology of the flower. This portion is profusely and beautifully illustrated; but we regret that the derivations of the different terms employed have been omitted, as to very many they prove of the greatest assistance.

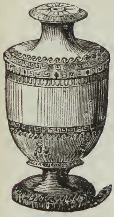
The second part treats of the general principles of Classification, or Systematic Botany. A description is given of the artificial and natural systems of Linnæus, Jussieu, De Candolle, Endlicher, and Lindley. The classification adopted by the author is one founded upon those of Jussieu, De Candolle, and Lindley—that of De Candolle being the basis. In his description of the natural orders, he commences with the most highly developed, gradually descending to those of lower organization, giving a full description of the general characters of the order; together with a diagnosis, the number of plants contained in the order, and their distribution, their properties, and uses; and a concise but explicit account of the plants useful in medicine, the arts, or domestic economy, and the products obtained from them; the principal adulterations to which they are liable, and the method of detecting them. This portion of the work will be found very useful to the medical and pharmaceutical student, and afford much useful information to others interested in the arts, &c.

The concluding portion of the work treats of Physiology, or Organology; and under this head a very full and interesting account is given of the laws which regulate the life, growth, and reproduction of plants, and the functions of the different organs of nutrition and reproduction. We are sorry to find that the author was precluded, by the limits to the size of the *Manual*, from appending a glossary, as, in our opinion, such an addition would have proved a great acquisition. We have made free use of the work in the compilation of our articles on the Natural Orders of Plants; and have little doubt that it will occupy a position among the best and most popular books on the subject.

DR. TORREY'S HERBARIUM.—Through the *Amer. Med. Times*, we learn that Dr. Torrey has presented "his immense *herbarium*, the fruit of forty years assiduous labour, together with his valuable botanical library," to the Trustees of Columbia College, who have provided accommodation for them, and also a residence for Dr. Torrey in the College. This collection is said to embrace examples of nearly all the collections of Government expeditions, from that of 1819, under Major Long, to the recent results. Besides, the collection embraces numerous specimens from the Floras of Europe, Asia, Australia, and South Africa. Dr. Torrey does not propose abandoning his botanical pursuits; but hopes, under the auspices of the College, to prosecute them under more favourable circumstances.

NOTES OF NOVELTIES

ETRUSCAN FILTER.



It may be in the remembrance of our readers that the Silicated Carbon Filter Company offered a premium for the best design for a table filter applicable to their filtering medium, which has been already described in our pages; several very meritorious designs were forwarded in competition, but the one selected was the exceedingly elegant and classical Etruscan shape shown in the annexed engraving.

The external case is formed of porous earthenware, a material which presents great advantages, as when moistened, evaporation takes place with considerable rapidity from the external surface, and thus a degree of cold is produced which renders the filtered water much more palatable and refreshing, during the warm summer weather, than it would be otherwise. The filter is formed in various colours, as blue; the well-known Etruscan red, so well imitated by the celebrated Wedgewood; &c., &c. The figures and other ornamentation are, in all cases, in strict accordance with the general character of vessel.

In the efficacy of its filtering medium, in the elegance of its appearance, and in the delicious coolness which it imparts to the contained fluid, this filter is not surpassed by any that has been brought before the public.

MORGAN'S NEW REGISTERED ELASTIC STOCKING.

These stockings appear to be made on an entirely new principle, which gives a far greater amount of elasticity than the old method of forming them on a knitting-frame, which was first introduced some fourteen or fifteen years since. In consequence of this increased amount of elastic power, there is far greater ease to the wearer, more freedom of action, and far greater durability in wear. Each thread of the silken fabric that encloses the elastic threads of caoutchouc is so knitted as to form a tight loop, and each loop must be first worn through before the thread can give way; in this manner a vastly increased wearing power is obtained. Whilst these valuable advantages have been secured, the old clumsy aspect of the former stocking is entirely obviated, and in its place there is an elegant combination of the useful with the ornamental.

The new registered stocking possesses the additional advantage of being washable, for as it is made with the best quality of silk, it can, when soiled with lengthened use, be easily cleaned by washing in lukewarm water, with a little curd soap; and in this manner, after very considerable wear, can be restored to its original bright and silken lustre.

We have examined the construction of these stockings very carefully, and have no hesitation in stating that, for elegance of form, power of support, and superiority of workmanship, they far surpass any that we have hitherto examined; and we have no doubt but that, owing to their peculiarity of construction, they will be found vastly more durable than those in ordinary use.

CHEMICAL STONE-WARE MANUFACTURE.

The manufacture of Chemical Stone-ware has latterly assumed so high a degree of importance that we have thought it desirable to bring before our subscribers the following account of the various materials employed, the different processes to which they are subjected, and the numerous uses to which the manufactured articles can be applied. We have, therefore, paid a visit to the potteries of Messrs. J. Cliff and Co., Princes-street, Lambeth, and, by the kind courtesy of the firm, have been enabled to trace the various steps of the manufacture, from the reception of the raw material to its conversion into the finished article.

The materials employed are chiefly white clays, obtained from the counties of Devon and Dorset, with a certain amount of kaolin, or China clay, from Cornwall; and for glazing purposes a proportion of Cornish stone, felspar, &c. To the former are added sand, ground flint, and other clays of a more or less infusible character, according to the quality of body required, from Maidstone Wortley, near Leeds, and Newcastle-on-Tyne; and for certain kinds of ware a large proportion of pounded broken earthenware, technically known as rough stuff, or grit, is used.

On referring to the "Mineral Statistics," published by the Geological Museum, we find that the various kinds of pottery and fire clays produced in England alone in the year 1858, amounted to upwards of four hundred thousand tons, and that the estimated value was nearly three hundred thousand pounds. These totals do not include the clays used for the manufacture of bricks and tiles.

The Devonshire clays are purer than those of Dorset, and are used for the manufacture of the smaller wares. Those of Dorset contain a certain admixture of lime and iron, rendering them less pure, and consequently of less value. They are used in combination with a certain amount of the Devon and Dorset clay for the larger vessels.

The articles intended for the use of chemical manufacturers require great care in making and burning, both as to the proper proportions of the materials employed and their due admixture. These vessels have frequently to resist the action of the strongest acids, and that at a high temperature, consequently it is absolutely necessary that they should admit of a certain amount of expansion and contraction without breaking. This quality is obtained by the mixtures of complex materials, that of each manufacturer varying from the other.

The clays employed at these potteries are sent from the pits in cubical tesses, weighing usually about thirty-five pounds each. After having been well dried these are reduced to powder in a crushing mill. The due admixture requisite to form the articles required is then thrown into a pug mill, which is an upright cylinder, about six feet deep by two in diameter, having a perpendicular shaft running through it. This shaft, which is caused to rotate by steam power, has a number of blades set on it, forming a kind of screw. These arms or blades so work amongst the powdered clays, &c., &c., as to mix them intimately with the water admitted, at the discretion of the workman, into the cylinder through a pipe, and, by their continued action, to force it out of the bottom in a plastic state of such uniform consistency, and so free from bubbles of air, that it is fit for the thrower, who fashions it into the required form on the potter's wheel. This is a kind of lathe, formed of a shaft, having a vertical instead of the usual horizontal position. On the upper extremity of the upright shaft of this lathe is fixed a small circular disk, which revolves with it. On this disk the workman places the lump of prepared clay, and, by pressure with his hands, aided by a few simple tools, fashions this yielding material into any required shape with a truly marvellous degree of dexterity and rapidity. It is with the aid of this simple contrivance that almost all circular articles are made, from penny ink-bottles, which are sold at 2*s.* 6*d.* per gross, to the enormous vessels manufactured by Messrs. Cliff, some of which are capable of holding 800 gallons.

The vessels having been made, are placed in the drying-room to become thoroughly dried; after which, those termed double-glazed stone-ware, such as spirit cans, druggists' pots, &c., are dipped in liquid glaze, and taken to the kiln to burn. This, as usually constructed, is a large circular room, about ten to fifteen feet in diameter, and fourteen feet high. It is lined with the best Wortley fire-bricks, and has at its sides a number of openings to admit the heat from the fires. It has also apertures in the roof to allow the escape of the waste heat and smoke. The articles to be burnt are placed in the kiln, piled up on one another, as is the case with small goods, or, if large, singly on slabs or quarries. The opening is then built up and carefully cemented over, when the fires are lighted, and are gradually increased until every article in the interior becomes heated to an intense white heat, which process takes, with a fifteen-foot kiln, from forty to fifty hours, consuming ten tons of coal. If the articles are to be salt glazed, a quantity of very coarse salt is thrown in through the holes left in the roof of the kiln, and into each fire-hole, shortly before the termination of the firing. This is at once converted into vapour by the intense heat, and is decomposed. The soda of the salt unites with the silica of the clay, and forms a fusible glass or glaze upon the surface. So perfect is this glazing, that articles thus protected have been found to resist for twenty years without deterioration the action of the nitrous acid of commerce. After the glazing operation the kiln is carefully stopped, to prevent draughts of cold air, and is then allowed to cool for thirty to forty hours before it is opened and the articles removed.

For other kinds of glazing a different process is employed, the vessels being dipped into a composition of materials that melt during the firing into the kind of glaze required. It may be noticed, that many stone-ware articles are of two colours—as, for example, a brown top with a buff-coloured base; the darker top being given by the addition of a proportion of manganese to the glaze.

Messrs. Cliff have introduced several improvements into the process of firing in their patent kiln. For instance, the articles are not exposed to the direct action of the fire, but are enclosed in an inner kiln, the fire playing between the two, and the draught also traversing numerous hollow pipes which are connected with a hollow bottom communicating with the furnace, and support the shelving in the interior; thus the articles are raised to the required temperature without being exposed to the immediate action of the flames, and are burnt and cooled quicker, and more evenly than by the old process, while at the same time it holds more goods, and has much less gear to remove each charge.

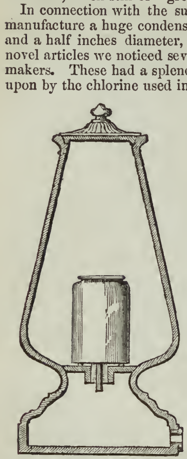
Among the articles manufactured at Messrs. Cliffs' that are more immediately interesting to our subscribers, we may mention the condensing worms, found in all sizes from 18 to 54 inches in height, and from $\frac{5}{8}$-inch to upwards of three inches bore, stills, taps, bowls, &c., &c., the materials of which these are manufactured varying almost with every variety. The worms are built up by curving the required diameter of pipe to the proper circle sufficient for one coil; these are, when stiff or "green," built up one over the other to the height required.

In connection with the subject of distillation, we may state that we saw in the process of manufacture a huge condenser, consisting of a series of pipes, each six feet in length by three and a half inches diameter, to be joined by curved end pieces. Amongst other large sized novel articles we noticed several stone-ware rollers, each six feet long, to be used by paper-makers. These had a splendid face, and were most valuable as not being liable to be acted upon by the chlorine used in bleaching the pulp.

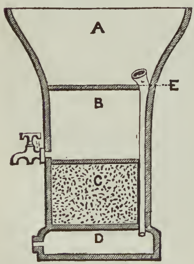
So numerous are the chemical wares, such as bottles, receivers, stone jars, percolators, tincture jars, &c., &c., that we can only allude to a few. The adaptation of the spherically ground air-tight stopper to openings of all sizes, even up to eighteen inches or two feet in diameter, renders these wares much more useful to chemists than they would be otherwise, as when used for tincture jars, percolators, and spirit barrels, they possess the advantage of not allowing the loss of any spirit by evaporation, and are easily worked, all the trouble required being that they are kept *clean.*

These spherical stoppers are turned in a lathe, and are fitted to the jars, after being burnt, by grinding with fine emery powder, each jar and lid being afterwards lettered to correspond.

The adaptation of these air-tight lids to stone-ware jars of all sizes, is of great advantage to the holders of volatile drugs, and those liable to spoil by exposure to the air. It would be impossible to enumerate all the useful implements and appliances that are made of stone-ware, from bottles at less than a farthing each, and cheap infusion pots at 9*d.* each, to the condensing worm at six guineas, and vessels of enormous bulk at a much greater price.


Danchell's Filter.

We have not alluded to the application of stone-ware to the external casing of filters, for which it is peculiarly adapted. Messrs. Cliff & Co. are large manufacturers of various forms. Among the most useful, we may indicate Danchell's filter, which filters very rapidly; and also a very ingenious ascension filter, of which the annexed engraving shows a section. In this filter, the water to be purified is placed in the chamber A (the only outlet to which is the pipe E, fitted with a sponge at its mouth); it passes down the pipe to the chamber D; here a deposit of the impurities is made, the water having to rise through the filtering medium at C, thence into the chamber B, from which it can be drawn off at pleasure.



Ascension Filter.

In this ascension filter, the bottom chamber is the receptacle for the greater portion of the impurities which remain after passing the sponge; here they settle to the bottom, instead of being received into the body of the filtering substance. To cleanse the filter it is therefore only necessary to rinse the bottom chamber with clean water, thus keeping the filter in a fit state for constant use with little or no trouble.

It is scarcely necessary to add, that both these forms of filter could be readily used with any filtering medium to which it may be considered desirable to adapt them.

WOTHERSPOON'S VICTORIA LOZENGES.

Samples of Messrs. Wotherspoon's Victoria Lozenges have been forwarded to us, and submitted to examination, with the following results:—

We find they consist entirely of pure sugar, flavoured with essential oils and essences, with the exception of the ginger, which contains some very finely ground ginger. They are also free from colouring matter, and the shape is peculiar, being that of a flattened sphere. It is evident that they are preferable to the ordinary kinds for the following reasons:—That they are composed of pure sugar, instead of being mixed with a quantity of wheaten or other starch, as the usual description of lozenges; that they contain no colouring matter, and are perfectly white, thus ensuring the use of none but the best sugar; that their peculiar form, having a perfectly smooth surface, and no sharp edges, gives them a far more pleasant feeling in the mouth than those of the common form. These lozenges are made entirely by machinery, thus preventing any working with the hands, and are sent out by the manufacturers in packets, so that they are not handled in their passage from the makers to the consumer.

GRANULATED CARBONATE OF IRON SALT.

Under the above title, Mr. Brewer has forwarded to us a very elegant chalybeate effervescing aperient. It is evidently formed of the usual saline ingredients of an effervescing draught, combined with a small proportion of a salt of iron. When dissolved, effervescence ensues, and the protocarbonate of iron, in a nascent state, is produced, the solution remaining perfectly clear. The proportion of iron contained is one grain in every drachm. From being in a dry state, the preparation is portable, permanent, and possesses a definite composition. It may certainly be described as an elegant and effective combination of iron, in a form which can be readily assimilated, with a saline aperient, well calculated to prevent its injurious astringent effects.

THE MONTH

UNITED SOCIETY OF CHEMISTS AND DRUGGISTS.

The first Half-yearly Meeting of the General Committee of this Society was held in the large room of the London Coffee House, Ludgate Hill, on Friday, the 5th instant, Henry Matthews, Esq., F.C.S., in the chair; the attendance was numerous. The Secretary introduced the business of the meeting by stating that they were called together in accordance with the arrangements made at the public meeting on the 20th of January last, when an Executive Committee was elected to complete the organisation of the Society, and to draw up, in draft, a form of Rules, to be submitted for approval to the General Committee. The Executive had, in fulfilment of these matters, actively exerted themselves, during the intervening time, in obtaining the consent of gentlemen of scientific standing, connected with the Chemical Society, and also of gentlemen well known in the trade, as the first officers of the Society. They had also prepared a code of Rules, and while doing so, they had made arrangements for extending the operations of the Society; and they had the pleasure to announce that gentlemen, very well known in their respective localities, were willing to act as agents and members of the General Committee, at Manchester, Birmingham, Liverpool, Hull, Birkenhead, Newcastle, Sunderland, Gateshead, Derby, Bath, Bristol, Shrewsbury, Bolton, Bedale, Southampton, Brighton, Peterboro', and many other places. In doing this, they have endeavoured to spread, as far as possible, a knowledge of the objects of the Society, and not the least result has been the creation of a very heavy correspondence throughout the kingdom. From all parts of Scotland, Ireland, and Wales they have received suggestions and encouragement; and it is a matter of congratulation that so large an amount of advertising has been done at a very small expense, and that there is still an available balance at their bankers. The numerical force of the Society is steadily increasing, and there is a good prospect that, at the end of the first official year of the Society, the Register will have enrolled upon it upwards of twelve hundred members. It will thus be seen that, in the face of great difficulties and the necessity of strict economy, the Society is progressing. By persevering efforts, by a candid and open exposition, at all times, of their accounts and actions to the whole of their members, and a determination that the Society shall represent the ENTIRE TRADE, they hope to exclude cliquism, and to render it a community whose intelligence and social standing only requires unity of action to place it amongst the most important social institutions of the time.

In making this statement, the Executive deemed it right not to disguise the difficulties they have to contend with. The aid from quarters where they had the most right to expect it, is being withheld until the Society is thoroughly established. Some antagonism also, and a large amount of apathy stand in their way, yet the Society is already in that position that it can offer a vigorous opposition to any legislative restriction; and it entirely rests with the trade whether the very practical objects which are already beginning to be availed of shall be made largely advantageous to the Chemists and Druggists of the United Kingdom, and whether the Society shall grow into an institution that they will be proud of.

The following Resolutions were then unanimously carried :—

1st.—"That this Meeting of the General Committee recognise the valuable exertions of the Executive Committee during the past half year, and confirms the appointment of the gentlemen, who have been invited by them to become the officers of the Society for the current year."

2nd.—"That the Rules for the government of the Society, as proposed by the Executive Committee, be received and adopted, and that they be printed, and distributed amongst the members in such manner and time as may be deemed expedient by the Executive Committee."

3rd.—"That this Meeting cordially expresses its thanks to those members of the wholesale trade who have, in a spirit of fairness, judged the Society by its principles, and kindly afforde their encouragement and support in aid of its objects, and congratulates them upon the increasing strength of a Society which promises to have a large number of members in every town in the United Kingdom."

An interesting discussion was then continued, by the consideration of various suggestions for promoting the objects of the Society; and it was ultimately agreed that the Executive should inaugurate the Benevolent Fund by a dinner, amongst the members and their friends, towards the close of the year, every gentlemen present pledging himself to support the arrangement. A vote of thanks to the Chairman for his able conduct, concluded the proceedings of the meeting.

POISONINGS.—Under this head we publish a monthly epitome of occurrences which seem to be continually on the increase, in spite of the contrivances invented for their prevention. The sad mistake by which the wife of a dignitary of the Church was nearly poisoned, the particulars of which will be found below, has again prominently brought the subject before the public. The ordinary label appears to have been on the bottle, but experience has proved that it is an extraordinary one that is required. In a recent number we noticed Morson's contrivance for effecting the object in view, and some time since attention was directed in our pages to Toogood's bottles. Unless the trade are prepared to endorse the dictum of Mr. Squire, that "persons who will not read the ordinary labels on ordinary bottles deserve to be poisoned," it is high time they took some steps to remedy this growing evil. The evidence proves that many of the cases which have recently come under our notice, would have been prevented by the use of bottles with restricted necks. Experience seems to prove that mere labelling, however excellent, is insufficient, and until something more efficient is produced, surely it were wise to adopt the best means at hand. A pamphlet, "On Poisons and the best means for preventing Accidents, &c.," has lately been issued by Messrs. Savory and Moore, the originators of the scheme proposed in connection with the Patent Safeguard Bottles. This pamphlet we recommend to the notice of every pharmacist.—The following is the particular case referred to in the above paragraph: On Sunday morning, June 16th, Mrs. Peel, the wife of the Dean of Worcester, took by mistake a large dose of laudanum, in place of some other medicine which she supposed a bottle standing in her room to contain. She remained in a state of syncope for some time, but by the timely application of remedies, the fatal effects were averted.—An inquest was lately held at the Salutation, Princes-street, Stamford-street, by Mr. W. Carter, coroner for East Surrey, on the body of Christopher Kemish, aged 50, who died from the effects of an overdose of colchicum. Evidence was given by the widow of the deceased and other witnesses, to the effect that deceased had for a considerable time suffered from gout, for which he took small quantities of tincture of colchicum. He appeared well on Tuesday, June the 4th, but about one o'clock in the morning he felt some indications of an attack of gout, and got up for the purpose of taking the remedy. It appears that he always kept a supply of the colchicum at hand, and there were two bottles in the room, one containing a small portion of colchicum, and the other nearly full. It is supposed that he took up the latter and drank from the bottle, as he was in the habit of doing, what he considered to be his usual dose, but there appears to be no doubt that the bottle being full, he took more than he intended. He was shortly afterwards seized with violent purging, and about seven o'clock, having discovered that he had taken the wrong bottle, Dr. Johnson, of Waterloo-road, was sent for, who, on finding the length of time that had elapsed since the colchicum was swallowed, could only employ stimulants and other remedies with the hope of arresting the progress of the poison. These, however, failed, and the deceased gradually sank and expired in the course of the evening. The jury returned the following verdict: "That the deceased had poisoned himself by misadventure."

Correspondence

To the Editor of the "Chemist and Druggist."

THE TWO SOCIETIES.

Westminster, July 6, 1861.

Sir,—Twelve months since you inserted my response to a proposition that a new society should be formed. I then opined that the reason one did not exist was not from apathy, but the want of a medium to make our wishes known, and that in your journal we had the means. Through the proprietors' liberality and genuine co-operation we have obtained a combination we never could have acquired otherwise; and our Society is an acccomplished fact. An erroneous notion has been and is yet prevalent, which has caused opposition from the Pharmaceutical Society, and several wholesale firms. We have surmounted these prejudices by our own persevering endeavours. Indifferent to falsehood and insinuations issued against us, we have treated existing institutions with courtesy and good feeling. The Pharmaceutical Society now declares that we are "Knocking at its doors for admittance." The truth is, the druggist generally not being scientific but a trading body, is not represented by that Society, consequently the true pharmacists are few and insufficient to maintain their institution; to resuscitate which a proposition is now put forth to admit the elder non-pharmacists to its privileges. To many in town, and to most in the country, the diploma is not worth knocking for. Old members and associates need not fear inundation by the "ignorant." They will not be induced by a qualification utterly unsuited to their wants and business, to leave the United Society, where the interests of the entire trade are considered and supported. They do not wish to see the P. S. die of inanition, much less the desertion of it by its old subscribers. There is need of both Societies; at any rate we are willing to support it for educational purposes, whilst we urge our own special advantages.

Wholesale firms have stood aloof from three-fourths of their customers to support one-fourth. It remains, then, for every member of the new Society to express, through the several representatives of their wholesale houses, that they are sincere in pressing the claims of the United Society, and I am sure they will then see the propriety of attending to the wishes of their chief supporters. Our success will prove to the protectionists of Bloomsbury that a majority of respectable educated men are not to be put down by a minority, many of whom have no other claim to an educational degree, than having subscribed to a society which is now confessedly in a very precarious state.

I am, Sir, yours truly,
John Wade.

Gigantic Robbery.

Sir,—A pithy little paragraph under this title, in one of your recent numbers, explains how the matter of the *Chemist and Druggist* is "conveyed" by some of your American contemporaries. Permit me to use the same phrase in calling attention to what has long been practised against us by the leviathan carriers of this country, compared to which the former robbery assumes very homœopathic proportions. At the worst, you are only quoted without acknowledgment about once a week,—we are swindled daily. And now that you have disposed of these homœopathic rogues—these hedge-sparrows of rascaldom—let me beseech you to turn your guns on those leviathan swindlers—the railway companies.

I must leave the treatment of the subject in your able hands, and content myself with pointing out the system of plunder pursued, which, like all great swindles, is chiefly remarkable for its simplicity. The plan, as brought under my own and my neighbour's notice, is this:—We order from our wholesale correspondent a parcel of goods. These goods it is necessary to pack in two or more packages, which are sent off from the warehouse *together*. They are then separated somewhere, and delivered to us one by one, and we are mulcted in the difference charged for several deliveries. I enclose several documents bearing upon the last transactions of this nature, by which you will perceive that on a specific date my London factors sent off three cases of goods, and that they hold the receipt of the railway company's carman, as being duly booked to be forwarded together. I received them one at a time, and thereby have to pay an excess of carriage.

Now, sir, these facts speak for themselves, and as we are powerless against these gigantic companies, who seem to consider us as lawfal prey, I trust that you will make good use of your pen—the only one that we pharmacists can appeal to—to get this matter rectified. By so doing you will earn our gratitude,

M. P. S.

[This is by no means the first or only letter which has reached us on the subject; we purpose in our next recurring to it, and meantime shall be glad of any information bearing on the matter.—Ed.]

NOTES AND QUERIES

Sulphurous Acid.—J. S. S. Sulphurous acid may be prepared by heating copper turnings or mercury with concentrated sulphuric acid in a glass flask; sulphate of copper, or persulphate of mercury, and sulphurous acid are formed: this latter is passed through a wash bottle to remove any trace of sulphuric acid which comes over, and then through a tube containing chloride of calcium if the gas be wanted dry; it may be collected over mercury in the pneumatic trough, or by displacement of air; it cannot be collected over water owing to its great solubility in that liquid.

X. Y. Z.—Will any of our readers kindly give this correspondent a good recipe for harness composition.

A. B. would feel obliged if any brother pharmacist will give him the formula of making the ointment to dry a cow by rubbing on the rudder.

T. H. wishes to know if any book is published for registering the sale of poisons in compliance with the Act of Parliament; and if so, where it may be purchased.

TRADE REPORT.

13th July, 1861.

Throughout the past month the money market has continued very tight, and the Bank rate of 6 per cent. has been firmly maintained; the great drain for sovereigns for America, and the payment for silver for the East, is likely to further enhance the rate of discount. Business, in nearly all departments, has been very sluggish, the trade buying only from hand to mouth; but during the last few days there is a slight improvement, consequent on the more quiet tone on the continent, and the expectation of a speedy termination of hostilities in America. Consols declined to 89½ ex. div., but are now firmer, and yesterday closed at 90 90⅛ for money, and at 90⅛ 90¼ for the next account.

In Chemicals there has been rather an improved business, but in many instances lower prices have again been taken. Moderate sales have been made in tartaric acid at 1*s.* 9*d.* Citric acid declined to 1*s.* 8½*d.* cash, and 1*s.* 9*d.* usual terms, and now is a shade firmer, at the latter price. More doing in sal acetos at 10¼*d.* up to 11½*d*, according to quantity. Iodine, in retail lots, have sold at 4½*d.* for seconds, and 5*d.* for firsts. Oxalic has been sold at 7¾*d.* and 8*d.* for seconds, and 8½*d.* and 9*d.* for the best. Soda ash is dull at our quotation. Soda crystals quiet at 4*l.* 2*s.* 6*d.* ex ship. Prussiate of potass quiet at 1*s.* 1½*d.* and 1*s.* 2*d.* Bichromate remains quiet at 9¼*d.* Sal ammoniac 31*s.* and 32*s.* 6*d.*, according to quality. Flour of brimstone dull at 15*s.* Sulphate of ammonia, retail sales, at 13*s.* 6*d.* and 14*s.* Sulphate of copper 31*s.* and 31*s.* 6*d.*, with few sales. Canada ashes have declined, pots to 34*s.* 6*d.*, pearls to 36*s.* Turpentine has been in large demand on speculation, and the price advanced to 52*s.* 6*d.* and 53*s.*; there is now less doing, and the price quiet at 51*s.* Linseed oil is firmer, and now few sellers under 30*s.* 6*d.* here.

The Drug market has been quiet, with only small sales. Cape aloes have advanced about 1*s.* per cwt., good and fine fetching 40*s.* and 43*s.* Cardamoms are rather cheaper. Oil anniseed is quiet at 6*s.* 9*d.*, and oil of Cassia has declined to 8*s.* 6*d.* Castor oil has advanced ¼*d.* per lb., fine pale firsts selling at 6¼*d.*, and 6¾*d.*, and middling to good seconds 5½*d.* and 6*d.* China rhubarb is 2*d.* to 3*d.* cheaper; a large parcel of good sound sold at 2*s.* and 2*s.* 3*d.*, and flat at 2*s.* and 2*s.* 1*d.* Several sales of Tinnevelly senna have been sold at full prices. Camphor is rather cheaper; good Japan, in tubs, sold at 11*l.* 10*s.*

PRICE CURRENT.

☞ *These quotations are the latest for* ACTUAL SALES *in Mincing Lane. It will be necessary for our retail subscribers to bear in mind that they cannot, as a rule, purchase at the prices quoted, inasmuch as these are the* CASH PRICES IN BULK. *They will, however, be able to form a tolerably correct idea of what they ought to pay.*

	1861.				1860.			
	s.	d.	s.	d.	s.	d.	s.	d.
ARGOL, Cape..per cwt.	90	0..	100	0	90	0..	105	0
French	60	0..	85	0	60	0..	80	0
Oporto, white	0	0..	0	0	0	0..	0	0
red	45	0..	0	0	50	0..	54	0
Sicily	85	0..	90	0	75	0..	80	0
Naples, white	85	0..	90	0	85	0..	90	0
red	0	0..	0	0	0	0..	0	0
Florence, white	95	0..	105	0	95	0..	105	0
red	95	0..	97	6	85	0..	95	0
Bologna, white	120	0..	125	0	125	0..	130	0
ARROWROOT, duty 4½d. per cwt.								
Bermuda ....per lb.	1	1..	1	6	1	3..	1	5½
St. Vincent	0	2½..	0	6	0	2¾..	0	6¼
Jamaica	0	2½..	0	4½	0	2 ..	0	4
Other West India ..	0	2..	0	3¼	0	2..	0	3¼
Brazil	0	1½..	0	2¼	0	1½..	0	2¼
East India	0	1¾..	0	2½	0	1¾..	0	2½
Natal	0	2½..	0	7	0	3½..	0	7½
Sierra Leone	0	2½..	0	3	0	2½..	0	3½
ASHES,......per cwt.								
Pot, Canada, 1st sort	34	6..	0	0	32	0..	33	0
U. S., 1st sort	0	0..	0	0	0	0..	0	0
Pearl, Canada, 1st sort	36	0..	0	0	32	0..	32	6
U. S., 1st sort	0	0..	0	0	0	0..	0	0
BRIMSTONE,								
rough ......per ton	£8	0..	0	0	£10	0..	0	0
roll	13	10..	14	0	14	10..	15	0
flour	14	10..	15	10	16	10..	17	0
CAPERS,								
French......per cwt.	£3	0..	£5	0	£3	10..	£6	15

	1861.				1860.			
CHEMICALS	s.	d.	s.	d.	s.	d.	s.	d.
Acid—Acetic, per lb.	0	4 ..	0	4½	0	4..	0	4½
Citric	1	9 ..	0	0	2	0..	0	0
Nitric..........	0	3½..	0	4	0	5..	0	5½
Oxalic	0	8½..	0	9½	0	8¼..	0	0
Sulphuric	0	0¾..	0	1	0	0¾..	0	1
Tartaric, crystal	1	9..	0	0	1	11½..	2	0
powdered.	1	10..	0	0	1	11½..	0	0
Alum ......per ton	£6	0	£6	10	£7	5	£0	0
powder	7	10..	0	0	8	10..	0	0
Ammonia, Carbon, lb.	0s.	5¾d.	0	6d.	0s.	6½d.	0	6¾
	£	s.	£	s.	£	s.	£	s.d
Sulphate ..per ton	13	10..	14	0	15	0..	15	10
Antimony, ore......	16	0..	17	0	16	0..	17	0
crude, per cwt..	30s.	0d.	0s.	0d	35s.	0d.	37s.	0
regulus	50	0..	51	0	50	0..	52	0
French star	51	0..	0	0	52	0..	53	0
Arsenic, lump	17	6..	18	6	18	0..	0	0
powder	9	0..	10	6	13	6..	14	0
Bleaching Powder ..	9	0..	10	0	11	0..	11	3
Borax, E. I. refined..	35	0..	45	0	44	0..	64	0
British	65	0..	0	0	65	0..	70	0
Brimstone, roll......	13	10..	14	0	14	10..	0	0
flour	14	6..	15	6	16	10..	17	0
Calomel ......per lb.	2	10..	0	0	2	10..	0	0
Camphor, refined ..	2	8..	3	2	2	3..	0	0
Copperas, green, pr tn.	65	0..	0	0	65	0..	0	0
Crrsiv. Sublimate, lb.	1	11..	2	0	2	1..	0	0
Green, Emerald, pr lb.	0	9..	0	11	0	9..	1	0
Brunswick, cwt..	14	0..	42	0	14	0..	42	0
Iodine, dry ..per oz.	0	4½..	0	5	0	6 ..	0	6½
Ivory Blk. drop pr. ct.	8	0..	9	0	0	0..	0	0

PRICE CURRENT—*continued.*

	1861.				1860.			
CHEMICALS.	s.	d.	s.	d.	s.	d.	s.	d.
Magnesia, Carbon. ct.	42	6..	45	0	42	6..	45	0
Calcined, lb.....	1	6..	0	0	1	6..	0	0
Minium, red, per cwt.	22	6..	23	0	23	6..	24	6
orange	35	0..	0	0	35	0..	0	0
Potash, Bichrom., lb.	0	9½..	0	0	0	11 ..	0	0
Chlorate........	0	10¼..	0	0	0	11..	0	0
Hydriodate ..oz.	0	5¼..	0	5½	0	7..	0	0
Prussiate ....lb.	1	1½	1	2	1	3..	1	3½
red..	2	2..	0	0	2	3..	0	0
Precipitate, red per lb.	2	9..	2	10	2	10..	2	11
white....	2	10..	0	0	2	10..	0	0
Prussian Blue	1	6..	1	10	1	6..	1	10
Rose Pink ..per cwt.	29	0..	30	0	29	0..	30	0
Sal-Acetos....per lb.	0	10½	0	11½	0	11 ..	0	0
Ammoniac, cwt.								
British ..	32	0..	33	0	32	6..	34	6
Epsom	8	3..	8	6	8	0..	0	0
Glauber	3	6..	5	6	5	0..	5	0
Saltpetre, refined....	37	0..	38	0	41	6..	42	6
Soda, Ash, per degree	0	2½..	0	0	0	2⅝..	0	2⅞
Bicarbonate ...cwt.	13	0..	13	6	15	0..	15	6
Crystals....per ton	£4	5/	£0	0/	£5	0/	.£0	0
Sugar Lead, white, ct.	37s.	0d.	38s.	0d.	38s.	0d.	39s.	0d.
brown..........	28	0..	0	0	28	0..	0	0
Sulphate Quinine, oz.								
British in bottle ..	7	2..	7	6	7	8..	8	0
Foreign	0	9..	7	0	7	6..	7	9
Sulphate Zinc ...cwt.	14	6..	15	0	14	6..	15	0
Verdigris ....lb.	1	3..	1	5	1	8..	2	0
Vermillion, English..	3	0..	3	4	3	0..	3	4
China....	2	3..	2	8	3	0..	3	3
Vitriol, blue or Roman								
per cwt...	31	6..	32	0	35	6..	36	0
CHICORY.... per cwt.								
Foreign (duty, 6s.) ..	17	0..	17	6	12	6..	13	6
COCHINEAL...per lb.								
Honduras, black	2	10..	4	8	3	8..	5	3
silver	2	6..	3	2	3	2..	4	0
pasty	2	1..	2	4	2	10..	3	1
Mexican, black......	2	6..	3	2	3	6..	4	3
silver......	2	4..	2	6	3	0..	3	3
Lima	2	4..	3	0	3	3..	4	0
Teneriffe, black	2	7..	3	4	3	6..	4	1
silver	2	6..	2	8	3	1..	3	5
COCOA (duty 1d. per lb.)								
Trinidad, red, in								
bond......per cwt.	60	0..	96	6	70	0..	97	0
gray	54	0..	60	0	68	0..	70	0
Grenada............	49	0..	56	0	60	0..	68	0
Dominica & St. Lucia	48	0..	50	0	62	0..	63	0
Para	56	0..	60	0	64	0..	68	0
Bahia	51	0..	53	0	52	0..	56	0
Guayaquil	54	0..	55	0	68	0..	70	0
COFFEE, in bond (duty 3d. per lb.)								
Jamaica, good, mid.								
to f...............	73	0..	100	0	72	0..	94	0
low mid. & mid.	68	0..	72	0	65	0..	70	0
fine ordinary ..	65	0..	67	0	62	0..	64	0
good ordinary ..	62	0..	64	0	59	0..	61	0
ord. and triage..	50	0..	60	0	46	0..	59	0
Ceylon, Nat. gd. & f.	62	0..	64	0	59	6..	63	0
ordinary	57	0..	61	6	55	0..	58	0
Plantation, fine..	85	0..	88	0	88	0..	92	0
fine mid.	77	0..	84	0	79	0..	86	0
good mid.	72	6..	76	0	75	0..	78	0
middling	68	6..	72	0	70	0..	74	0
fi. ord. to low md.	65	6..	67	6	64	0..	69	0
mixed and triage	50	0..	63	0	48	0..	65	6
Malabar and Mysore	58	0..	78	0	57	0..	78	0
Madras	58	0..	76	0	58	0..	76	0
Tellicherry	64	0..	90	0	62	0..	88	0
Mocha, fine	110	0	123	0	115	0	120	0
garbled	93	0	105	0	94	0	112	0
ungarbled	62	0.	100	0	62	0..	86	0
Batavia, yellow	63	0..	75	0	65	0..	78	0
pale and mixed..	58	0..	62	0	54	0..	64	0
Sumatra............	52	0..	54	0	50	0..	52	0
Padang	54	0..	60	0	54	0..	60	0
African	70	0..	85	0	80	0..	90	0
Brazil, f. ord. & wshd.	56	0..	70	0	60	0..	72	0
good ord.	53	0..	56	0	57	0..	60	0
ordinary	47	0..	51	0	51	0..	57	0
COFFEE.	s.	d.	s.	d.	s.	d.	s.	d.
La Guayra	60	0..	76	0	62	0..	78	0
Costa Rica, mid. to f.	67	0..	76	6	68	0..	84	0
good and f. ord.	63	0..	66	0	62	0..	68	0
Cuba, mid. to fine ..	67	0..	80	0	68	0..	82	0
f. ord. & f. f. ord.	63	0..	66	0	62	0..	68	0
ord. & good ord.	57	0..	62	0	55	0..	63	0
Porto Rico	60	0..	78	0	62	0..	78	0
St. Domingo........	58	0..	63	0	56	0..	65	0
DRUGS,	£.	s.	£.	s.	£.	s.	£.	s.
Aloes, Hepatic, pr. cwt.	3	10..	9	0	3	10..	10	0
Socotrine	6	0..	23	0	5	10..	24	10
Cape, good......	2	0..	2	3	1	15..	1	18
inferior ..	1	8..	1	18	1	2..	1	14
Barbadoes......	2	0..	22	0	2	0..	22	10
Ambergris, gray, p. oz.	34s.	0d.	42s.	0d.	30s.	0d.	42s.	0d.
Angelica Root. pr. cwt.	28	0..	40	0	35	0..	42	0
Aniseed, China star..	70	0..	78	0	90	0..	95	0
German, &c.	26	0..	44	0	32	0	42	6
Balsam, Canada, pr. lb.	1	4..	0	0	1	0..	1	1
Capivi	1	9..	1	10	1	11..	2	0
Peru........	4	6..	4	9	4	10..	4	11
Tolu	3	9..	0	0	3	10..	0	0
Bark, Cascarilla, cwt.	24	0..	49	0	30	0..	46	0
Peru. crwn. & gry. pr. lb.	1	6..	2	6	1	10..	3	4
Calisaya, flat ..	3	10..	4	0	3	4..	3	9
quill ..	3	4..	3	10	3	0..	3	8
Carthagena	0	10..	2	0	0	8..	1	0
Pitayo	1	6..	2	2	0	10..	1	10
Red	2	0..	6	0	2	0..	6	0
Bay Berries, per cwt,	22	0..	40	0	50	0..	52	0
Borax..............	20	0..	45	0	20	0..	37	6
Tincal	32	0..	55	0	30	0..	45	0
Bucca Leaves ....lb.	0	4 ..	1	3	0	5..	1	2
Burgundy Pitch, p. cwt.	0	0..	0	0	0	0..	0	0
Camomile Flowers..	30	0..	60	0	140	0	190	0
Camphor, China....	230	0	240	0	150	0..	0	0
Canella Alba........	22	0..	42	0	25	0..	45	0
Cantharides ..per lb.	2	4..	2	5	2	7..	2	8
Cardmms. Mlbr. good	4	6..	5	0	4	7..	4	10
inferior ..	4	4..	4	6	4	0..	4	7
Madras ..	2	10..	4	4	3	3..	4	3
Ceylon ...	3	6..	4	6	3	8..	3	9
Cassia Fistula, pr. cwt.	20	0..	30	0	28	0..	38	0
Castor Oil, 1st pale, lb.	0	6¼	0	6¾	0	6¼	0	6¾
second	0	5½	0	6	0	6..	0	6¼
infr. and dark	0	4¾	0	5¼	0	5¼	0	5¾
Bombay, in casks	0	4..	0	5	0	4..	0	4¼
Castorum	1	0..	28	0	5	0..	20	0
China Root..per cwt.	9	0..	10	0	9	0..	10	0
Coculus Indicus	12	0..	16	0	15	0..	16	0
Cod-liver Oil, per gal.	4	6..	5	0	4	9..	6	9
Colocynth, apple, p. lb.	0	8..	1	3	0	11..	1	9
Colombo Root, per cwt.	15	0..	47	6	14	0..	47	0
Corosus Nuts, per cwt.	13	0..	23	6	14	0..	25	0
Cream Tartar, per cwt.								
French	125	0..	0	0	140	0..	0	0
Venetian	127	6..	0	0	142	6..	0	0
gray	120	0	123	0	120	0	122	6
brown..........	115	0	118	0	0	0..	0	0
Croton Seed........	80	0	105	0	65	0..	80	0
Cubebs	150	0	160	0	230	0	240	0
Cummin Seed	36	0..	40	0	22	0..	30	0
Divi-divi............	13	0..	14	0	11	0..	13	0
Dragon's blood, reed.	£7	0	£12	0	£7	0	£14	0
lump	5	0..	10	0	5	0..	13	0
Galangal Root......	0	16..	20	0	1	6..	1	8
Gentian Root	0	15..	0	17	0	16..	0	17
Ginger, preserved, in bd.	s.	d.	s.	d.	s.	d.	s.	d.
(duty 2d. lb.) per lb.	0	5..	0	7	0	9..	0	9½
Guinea Grains.								
per cwt.	46	0..	48	0	58	0..	62	0
Honey, Narbonne ..	00	0..	85	0	70	0..	90	0
Cuba	25	0..	40	0	26	0..	38	0
Jamaica	24	0..	58	0	28	0..	55	0
Ipecacuanha, per lb..	4	0..	4	3	3	10..	0	0
Isinglass—								
Brazil............	1	6..	3	10	1	10..	4	2
East India........	0	9..	3	0	1	10..	4	3
West India	3	2..	3	9	3	10..	4	3
Russian, long staple	12	0..	13	0	12	0..	13	0
leaf......	9	6..	12	0	9	6..	12	0
Simovia..	2	0..	2	6	1	6..	2	6
Jalap..............	3	10..	4	7	3	10..	4	0

PRICE CURRENT—*continued.*

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DRUGS.	s.	d.	s.	d.	s.	d.	s.	d.
Juniper Berries, p. cwt.								
German and French	10	0..	10	6	9	0..	9	6
Italian	10	0..	12	0	9	0..	10	0
Lemon Juice, per deg.	0	1 ..	0	1⅛	0	0⅞..	0	0
Lichen Islandicus, lb.	0	0..	0	0	0	0..	0	0
Liquorice... per cwt.								
Spanish	83	0..	90	0	83	0..	93	0
Italian	85	0..	95	0	90	0..	98	0
Macaroni, Genoa, p. lb.	0	3..	0	6	0	3..	0	6
Naples....	0	4..	0	5½	0	4..	0	5½
Manna, flaky	3	0..	3	9	4	9..	5	3
small	1	6..	2	0	2	6..	2	7
Musk ....per oz.	26	0..	34	6	24	0..	27	0
Myrabolans, per cwt.	8	6..	12	0	9	6..	13	0
Nux Vomica........	8	0..	8	6	13	0..	14	6
Opium, Turkey	14	0..	18	6	21	6..	0	0
Egyptain....	6	0..	13	0	6	0..	14	0
Orris Root.. per cwt.	27	0..	30	0	28	0..	31	0
Pellitory Root	0	0..	0	0	0	0..	0	0
Pink Root....per lb.	1	2..	1	4	1	0..	1	3
Quassia (bit. wd.) ton	£3	10..	4	0	£9	0	£10	0
Rhatania Root.. p lb.	1s.	0d.	0s.	0d	0s.	6d.	0s.	8d
Rhubarb, China, rnd.	1	0..	2	7	1	2..	2	10
flat..	1	2..	2	9	1	4..	3	2
Dutch, trimd.	3	3..	3	6	3	5..	3	6
Russian	11	6..	0	0	13	6..	14	6
Saffron, Spanish	45	0..	49	0	50	0..	54	0
Salep......per cwt.	£12	0s.	£14	0	£9	0	£12	0
Sarsaparilla, Lima..	0s.	10d..	1s.	2d	0s.	10d..	1s.	2d
Para	0	10..	1	2	0	10..	1	2
Honduras	0	11..	1	6	0	11..	1	6
Jamaica.	1	3..	2	3	1	2..	2	6
Sassafras....per cwt.	10	0..	12	0	10	0..	12	0
Scammony .. per lb.								
virgin	28	0..	35	0	30	0..	30	0
second	14	0..	24	0	14	0..	26	0
Seedlac	50	0..	90	0	42	0..	60	0
Seneka Root........	2	9..	0	0	2	0..	2	2
Senna, Calcutta	0	1½..	0	2½	0	2..	0	2½
Bombay	0	2½..	0	3½	0	2..	0	4¼
Tinnevelly	0	2¾..	0	10½	0	4..	0	7¾
Alexandria	0	4..	0	7	0	4..	0	6
Shellac, orange, pr. ct.	180	0	215	0	195	0..	205	0
liver & garnet.	165	0	190	0	190	0..	200	0
block	130	0	160	0	175	0..	190	0
bttn. dk. to mid.	115	0	145	0	160	0..	180	0
good and fine.	160	0	185	0	185	0..	200	0
Snake Root	1	8 ..	0	0	0	10..	1	2
Spermaceti, refined..	1	1..	1	2½	1	8..	0	0
Squills	0	1..	0	2½	0	2..	0	4
Sticklac	70	0..	95	0	60	0..	85	0
Tamarinds, E. India.	10	0..	12	0	7	0..	10	0
W.I. per cwt.	16	0..	32	0	15	0..	40	0
Terra Japonica,								
Gambier.. per cwt.	15	0..	16	6	17	6..	18	0
Cutch	22	0..	23	0	26	0..	26	6
Valerian Root, Engl.	20	0 .	40	0	20	0..	40	0
Vanilla,								
Mexican .. per lb.	30	0..	45	0	40	0..	75	0
Brazil............	0	0..	0	0	0	0..	0	0
Wormseed ..per cwt.	2	0..	0	0	0	0..	0	0
FARINA, Scotch	20	0..	25	0	16	0..	16	6
GUM ....per cwt.	£.	s.	£.	s.	£.	s.	£.	s.
Ammoniac, drop	2	15..	5	0	2	15..	5	0
lump....	0	15..	1	15	0	15..	2	0
Animi, fine pale	15	0..	16	0	14	10..	16	0
bold amber ..	13	0..	14	0	13	0..	16	5
medium	8	10..	11	0	8	10..	11	10
small & dark.	5	0..	8	5	5	0..	8	0
ordinary dark	2	10..	5	0	2	10..	5	0
Arabic, E.I.f. palepickd	2	10..	2	17	2	10..	3	5
unsorted, good to f.	1	18..	2	10	1	15..	2	8
red and mixed	1	4..	1	10	1	4..	1	12
siftings	0	0..	0	0	0	18..	1	3
Turkey, pkd. gd. to fi.	5	10..	7	10	5	10..	7	10
second & infr.	2	2..	5	5	2	5..	5	5
in sorts	1	10..	2	3	1	16..	2	5
Gedda	1	6..	1	7	1	5..	1	6
Barbary, white......	1	11..	1	13	1	13..	1	15
brown	1	6..	1	7	1	8..	1	11
Cape	0	16..	0	18	0	15..	0	18
Assafœtida, fair to gd.	1	0..	5	0	1	0..	4	10
Benjamin, first qual.	18	10..	34	0	18	0..	35	0

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GUM.	£.	s.	£.	s.	£.	s.	£.	s.
Benjamin, 2nd qual.	8	5..	17	10	8	10..	16	10
3rd ,,	3	0..	7	10	3	0..	7	10
Copal, Angola red ..	5	0..	6	5	4	7..	4	15
pale..	4	5..	5	5	3	6..	4	10
Benguela	4	10..	5	10	3	10..	4	5
Sierra Leone lb.	0s.	7d.	1s.	6d	0s.	9d.	1s.	9d
Manilla, pr. ct.	15	0..	43	0	15	0..	43	0
Dammar, pale, pr. ct.	44	0..	48	0	40	0..	47	0
	£.	s.	£.	s.	£.	s.	£.	s.
Galbanum..........	7	0..	9	0	7	0..	9	0
Gamboge, pkd. pipe .	6	0..	8	0	6	10..	8	10
in sorts ..	4	0..	5	10	4	0..	5	15
	s.	d.	s.	d.	s.	d.	s.	d.
Guaiacum ....per lb.	0	8..	1	6	0	0..	0	0
Kino ...... per cwt.	140	0..	200	0	90	0..	105	0
Kowrie	16	0..	24	0	14	0..	15	6
Mastic, pkd., per lb..	7	6..	8	6	8	6..	9	6
Myrrh, gd. & fi., pr. ct.	140	0	180	0	160	0	220	0
sorts	80	0	130	0	90	0	150	0
Olibanum, pale drop.	60	0..	66	0	60	0..	70	0
amber & yellow	40	0..	54	0	40	0..	56	0
mixed & dark..	10	0..	26	0	12	0..	26	0
Senegal	38	0..	45	0	28	0..	33	0
Sandrac............	90	0	105	0	94	0	117	6
Tragacanth, leaf	180	0	340	0	190	0	340	0
in sorts .	100	0	130	0	100	0	126	0
LAC DYE, per lb. D. T.	1	10½..	2	0	1	10½..	2	1
B Mirzapore........	1	6..	1	7	1	7..	1	9
Other good and fine..	1	0..	2	5	1	1..	2	3
Ord. & Native marks	0	2..	0	11	0	2 ..	0	11
OILS..........per tun	£.	s.	£.	s.	£.	s.	£.	s.
Seal, pale	36	0..	0	0	35	0..	0	0
yellow	32	0..	34	0	31	10..	32	0
brown	30	0..	0	0	30	0..	0	0
Sperm, body........	93	0..	95	0	94	0..	0	0
headmatter	92	0..	0	0	95	0 .	95	10
Cod................	36	10..	0	0	39	0..	0	0
Whale, Greenland ..	0	0..	0	0	37	0..	37	5
South Sea, pale	36	0..	0	0	35	10..	36	0
yellow	33	0..	0	0	32	10..	0	0
brown	32	0..	0	0	30	0..	0	0
E. I. Fish	30	0..	0	0	28	10..	29	0
Olive, Galipoli ..tun	58	0..	59	0	62	0..	0	0
Trieste	57	0..	0	0	60	0..	0	0
Levant	53	0..	0	0	56	0..	57	0
Mogadore	47	10..	0	0	56	0..	0	0
Spanish	56	0..	57	0	60	10..	61	0
Sicily	55	0..	0	0	60	0..	0	0
Florence, pr. ½-chst.	0	19..	1	0	0	18..	1	0
Cocoanut, Cochin, tun	44	0..	44	6	46	10..	47	10
Ceylon....	43	0..	0	0	45	10..	46	0
Sydney ..	41	0..	43	0	39	0..	44	0
Ground Nut and Gin.								
Bombay..........	38	15..	39	10	39	0..	39	10
Madras	40	0..	42	0	44	0..	45	0
Palm, fine	44	0..	44	3	45	10..	0	0
Palm Nut..........	38	0..	39	0	33	0..	34	0
Linseed	30	6..	0	0	28	10..	28	15
Rapeseed, Engl. pale.	40	6..	41	0	42	10..	0	0
brown	38	6..	0	0	41	0..	0	0
Foreign do.	41	0..	42	0	43	10..	44	0
brown	0	0..	39	0	41	10..	42	0
Lard	59	0..	0	0	62	0..	0	0
Tallow	35	0..	0	0	30	0..	0	0
Rosin	0	0..	0	0	7	5..	0	0
OILS, Essential;	s.	d.	s.	d.	s.	d.	s.	d.
Almond, essen. pr. lb.	30	0..	31	0	30	0..	31	0
expressed..	1	0..	0	0	1	0..	0	0
Aniseed	6	9..	0	0	7	11..	8	0
Bay........ per cwt.	122	6..	0	0	90	0	100	0
Bergamott....per lb.	6	6..	14	0	6	6..	11	0
Cajeputa, bond, pr. oz.	0	1½..	0	1¾	0	1..	0	1¼
Caraway .... per lb.	4	3..	6	0	4	3..	6	0
Cassia..............	8	6..	0	0	12	6..	0	0
Cinnamon (inb.) p. oz.	2	0..	3	10	3	0..	4	3
Cinnamon Leaf	0	1..	0	2½	0	2 ..	0	2½
Citronel............	0	4¾..	0	5	0	3¼..	0	3¾
Clove..............	0	4¼..	0	0	0	2½..	0	3¾
Croton	0	3 ..	0	4	0	4¼..	0	4½
Juniper......per lb.	1	10..	4	0	3	0..	5	0
Lavender	2	6..	5	0	2	6..	5	0
Lemon	5	0..	10	6	5	0..	11	0
Lemongrass..per oz.	0	4¾..	0	6	0	6 ..	0	6½

PRICE CURRENT—*continued.*

	1861.				1860.			
OILS, Essential,	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
Mace, ex	0	2 ..	0	0	0	1¾..	0	0
Neroli	6	0..	9	0	6	0..	10	0
Nutmeg	0	1¾..	0	2	0	2½..	0	3
Orange ......per lb.	7	0..	8	0	10	2 ..	11	0
Otto Roses ..per oz.	16	0..	25	0	16	0..	26	0
Peppermint ..per lb.								
American	7	6..	15	0	8	0..	14	0
English	35	0..	42	0	24	6..	30	0
Rhodium ....per oz.	3	9..	6	0	3	9..	6	0
Rosemary ....per lb.	1	10..	3	0	2	0..	3	0
Sassafras	3	0..	3	6	3	6..	3	9
Spearmint	5	0..	12	6	5	0..	12	6
Spike	1	3..	1	6	1	3..	1	6
Thyme	1	9..	2	6	2	3..	3	0
PITCH, British, pr. cwt.	6	0..	6	6	10	0..	0	0
Swedish	10	3..	0	0	10	0..	15	0
SALTPETRE, per cwt.								
Bengal, 6 p.c. or under	36	0..	37	6	43	6..	44	6
• over 6 per cent.	33	6..	36	0	37	0..	43	0
Madras	32	0..	34	0	36	0..	41	0
Bombay	30	0..	32	6	34	0..	36	0
British-refined	37	0..	38	0	41	6..	42	0
Nitrate of Soda	12	9..	13	6	14	0..	14	6
SEED, Canary ...p. qr.	30	0..	46	0	54	0..	62	0
Caraway, English, p.c.	0	0..	0	0	0	0..	0	0
German, &c.	0	0..	0	0	30	0..	38	0
Clover, English, red..	0	0..	0	0	0	0..	0	0
white..	0	0..	0	0	0	0..	0	0
Germ. & French, red	0	0..	0	0	0	0..	0	0
white..	0	0..	0	0	0	0..	0	0
Coriander	0	0..	0	0	0	0..	0	0
East India	0	0..	0	0	11	6..	12	6
Hemp	46	0..	52	0	42	0..	44	0
Linseed, English, p. qr.	52	0..	56	0	0	0..	0	0
Black Sea and Azof	51	0..	52	0	49	0..	50	0
Calcutta	50	6..	52	6	49	0..	0	0
Bombay	54	0..	54	6	51	6..	0	0
Egyptian	49	0..	51	0	47	0..	0	0
St. Ptrsbg.. Morshnk	51	0..	52	0	48	6..	0	0
Archangel	46	0..	48	0	40	0..	41	0
Riga	42	0..	44	0	38	0..	40	0
Mustard, brown, p. bhl	5	0..	12	0	10	0..	13	0
white	5	0..	10	0	11	0..	14	0
Niger	50	0..	0	0	44	0..	45	0
Poppy, E.I. ..per qr.	57	6..	58	0	56	0..	0	0
Rape, English	0	0..	0	0	0	0..	0	0
Danube	60	0..	0	0	52	6..	0	0
Calcutta, fine	54	0..	55	0	55	6..	56	0
Bombay, Guzerat	63	0..	64	0	64	0..	65	0
Feroze. & Scinde	53	0..	57	0	54	0..	57	0
Teel, Sesame or Gngly.	62	0..	67	0	59	0..	65	0
Cotton ......per ton	7	15..	0	0	6	5..	6	10
Gnd. Nut Kernels, tn.	310	0..	330	0	310	0..	320	0
SOAP, Lond. yel. p. cwt.	21	0..	38	0	21	0..	38	0
mottled	34	0..	38	0	36	0..	38	6
curd	52	0..	0	0	52	0..	0	0
Castile	37	0..	40	0	37	0..	40	0
Marseilles	40	0..	41	0	40	0..	41	0
SOY, China ..(per gal.)	2	4..	2	5	4	0..	4	6
Japan	0	8..	0	10	0	0..	0	0
SPICES, duty free, except pepper,								
Cassia Lignea, p. cwt.	78	0..	90	0	82	0	92	0
Vera	12	0..	50	0	12	0..	26	0
Buds	200	0..	210	0	185	0	190	0
Cinnamon, per lb.								
Ceylon, 1st quality.	1	5..	2	7	1	6..	2	2
2nd ditto ..	1	2..	1	10	1	1..	1	7
3rd ditto ..	0	9..	1	4	0	10..	1	4
Tellicherry	0	10..	1	0	0	9..	0	11
Cloves, Penang	1	1½..	1	3	1	2 ..	1	4
Amboyna	0	4½.	0	5½	0	4¼..	0	5¾
Zanzibar	0	3¾.	0	4⅝	0	3⅝..	0	3¼
Ginger	£	s.	£	s.	£	s.	£	s.
Jamaica, fine pr. cwt.	7	0..	9	10	8	0..	10	0
ord. to good	2	5..	6	0	4	0..	7	10
African	33s.	0d. ..	33s.	6d.	39s.	0d.	39s.	6d.
Bengal	30	0..	32	0	22	0..	22	6
Malabar	36	0..	0	0	33	0..	34	0
Cochin	40	0.	105	0	70	0.	130	0
Mace, 1st qlty. lb.	1	6..	1	10	1	8..	2	0
2nd. & infr.	0	10..	1	4	1	1..	1	6
Nutmegs per lb.								
brown Penang, &c.	0	11..	4	0	1	6..	3	10
limed	0	10..	2	6	1	4..	2	6

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SPICES,	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
Pepper (duty 6d. pr. lb.)								
Black, in bond								
Malabar	0	4¼..	0	5¼	0	4½	0	5½
Aleppee	0	4¼..	0	4½	0	4¼	0	4¾
Penang & Batavia	0	3⅜..	0	3¾	0	3⅞..	0	4⅛
Singapore	0	3¾..	0	4	0	4	0	4⅛
White, Tellicherry.	0	10¼..	1	5	0	9¾.	1	0
Other sorts	0	5⅜..	0	6½	0	6 ..	0	7¼
Cayenne	1	1 ..	1	6	1	0..	1	4
Pod, S. Leone pr. c.	27	0..	32	0	30	0..	36	0
Zanzibar	70	0..	80	0	57	0..	61	0
Long	32	0..	37	0	32	0..	34	0
Pimento, mid. to good	0	2¾..	0	3	0	3½..	0	3⅝
ordinary	0	2½..	0	2⅝	0	3¼..	0	0
SPONGE, Turk. f. pkd.	20	0..	26	0	20	0..	26	0
fair to good	9	0..	18	0	9	0..	18	0
ordinary ..	3	0..	8	0	3	0..	8	0
Bahama ..	0	4..	1	3	0	3..	1	0
TEA (duty 1s. 5d. per lb.) in bond.								
Congou, ordinary	0	6½	0	8	1	2 ..	1	3
good ordinary	0	10 ..	0	11	1	3¼.	1	4½
but middling.	1	0 ..	0	0	1	5 ..	1	6
blackish leaf	1	2½..	1	5	1	6¼..	1	7
ditto strong	1	6..	1	9	1	8 ..	1	10
ditto to extra fine..	1	9..	2	5	2	0..	2	4
Ning Yong and Oolong	0	10..	2	0	1	5..	2	2
Souchong, ordinary..	0	10..	1	0	1	4..	1	5
fair to fine	1	2..	1	10	1	6..	2	0
finest	2	0..	3	1	2	0..	3	0
Flowry Pekoe, ordinary	1	3..	1	6	0	0..	0	0
fair to good	1	6½..	2	0	2	0..	2	6
fine to finest	2	6..	4	0	3	0..	6	0
Caper, scented, in bxs.	0	8 ..	2	1	1	2½..	2	6
Orange Pekoe, plain..	0	9..	0	10	1	4..	1	6
scented	0	11..	2	3	1	4..	2	6
Twankay, ordy. Canton	0	0..	0	0	0	0..	0	0
common to good..	0	10..	1	4	0	10..	1	0
fine to Hyson kind.	1	5..	1	6	1	3..	1	4
Hyson Skin, common	0	9..	1	0	0	10..	0	11
good to fine	1	1½	0	0	1	0..	1	1
Hyson, ordy. to comn.	1	8..	1	10	1	7..	1	8
fair to fine	2	0..	2	6	1	9..	2	6
finest	2	9..	4	6	2	9..	4	0
Young Hys. Boh. kind	0	10..	1	0	0	7..	0	9
good to fine	1	4..	2	3	0	11..	2	4
Imperial	1	4..	2	2	1	0..	2	2
Gunpowder	0	9½	3	9	1	0..	3	9
Assam	1	2..	4	6	1	7..	4	6
TURPENTINE,								
Rough.... per cwt.	16	0 ..	0	0	8	9 ..	0	0
Spirits, English	50	6..	0	0	33	0..	0	0
American, in casks	51	0..	0	0	34	0..	0	0
WAX, Bees, English ..	£8	5..	£8	10	£8	5..	£8	10
German	8	0..	8	15	8	0..	8	5
American	9	0..	10	0	8	10..	10	0
white fine	10	0..	10	10	10	0..	10	15
Jamaica	8	10..	9	10	9	0..	9	10
Gambia	9	0..	0	0	9	0..	9	10
Mogadore	6	10..	8	0	6	0..	7	10
East India	7	10..	8	10	8	0..	9	0
ditto, bleached	9	0..	11	0	9	0..	11	0
vegetable, Japan	2	14..	3	5	3	0..	3	3
WOOD, DYE, bar, pr. tn.	3	5..	0	0	3	10..	0	0
Brazil, first quality	70	0..	75	0	80	0..	89	0
second quality..	55	0..	60	0	60	0..	0	0
logs	15	0..	17	0	20	0..	25	0
Braziletto	4	0..	5	10	4	0..	5	10
Camwood	19	0..	24	0	24	0..	28	0
Ebony, Green	7	0..	8	10	9	10..	10	0
Fustic, Cuba	8	10..	9	0	8	15..	9	5
Jamaica	5	5..	5	15	5	10..	5	15
Savanilla	5	0..	5	5	5	5..	5	10
Zante	7	0..	9	0	9	10..	11	0
Logwood, Campeachy	6	10..	6	15	6	10..	6	15
Honduras ..	5	10..	5	15	5	5..	0	0
St. Domingo	5	0..	5	10	5	0..	0	0
Jamaica	4	15..	5	0	4	10..	4	15
Nicaragua, lar. & sol.	9	0..	0	0	12	0..	13	10
small	8	10..	0	0	6	0..	8	0
Lima, first pile	9	0..	10	0	13	0..	14	5
second pile ..	8	5..	8	15	12	10..	13	0
Red Sanders	6	0..	6 2	6*d*	5	10 ..	0	0
Sapan, Bimas	6	10..	8	0	6	10..	8	5
Siam, &c.	6	15..	9	0	6	0..	8	10

PATENTS

Selected and arranged by **WEATHERDON & Co.**, Patent Agents, 77, Chancery Lane.

LETTERS PATENT.

DRUGS, CHEMICALS, ETC.

2642 Harrison, E., Bradbury, W., Buckley, J., and Garside, D., Oldham, a certain compound or certain compounds to be used as a substitute for gunpowder.

2647 Crockford, C., Holywell, Flintshire, improvements in the manufacture of spelter from sulphuret of zinc.

2708 Prentiss, E. F., America, a new detergent.

2711 Webster, J., Birmingham, improvements in obtaining gas (mainly oxygen), for improving artificial light and for other purposes; also for utilizing the products resulting from its manufacture.

MISCELLANEOUS.

2623 Burch, J., Crag, Cheshire, and Booth, E., Manchester, certain improvements in extracting colouring matter from vegetable, animal, and other substances, and making decoctions and infusions therefrom.

2699 Wrigley, T., Bury, improvements in apparatus for filtering water and other liquids.

145 Piffard, B., Kentish-town, improvements in the preparation of non-conducting substances, for the deposition thereon of metals by electric action.

229 Verkrüzen, T. A., and Verkrüzen, M. A., Hatton-garden, a metal paint, and for applying the same by painting in gold and imitation gold, silver, or other metal colour, on velvet, cloth, and other fabrics having a pile or woolly or flossy surface.

328 Jarrett, G., Poultry, an improved apparatus, applicable for marking linen, and for other printing and stamping surfaces.

491 Tiernan, R., Liverpool, an improved apparatus for drawing liquid substances from vessels containing the same.

PROVISIONAL PATENTS.

DRUGS, CHEMICALS, ETC.

925 Furley, R. C., Edinburgh, rendering pills tasteless by means of a coating of albumen.

932 Malcolm, J. D., Brixton, improvements in the manufacture of nitric acid and caustic soda, which are also applicable to the obtaining of other chemical products.

983 Webster, J., Birmingham, improvements in manufacturing oxygen gas, and obtaining certain other products.

1006 Ward, P., Bristol, improvements in the manufacture of sulphuric acid.

INDIA RUBBER AND GUTTA PERCHA.

924 Miller, T., Fossaway, Perth, improvements in the method of, and machinery for, preparing india rubber and other similar gums, for insulating telegraphic wires, and in machinery for laying or applying strips of india rubber and other similar gums, or strips of fibrous or textile material, on to telegraphic wires.

981 Noirot, J. B. J., Paris, an improved process for manufacturing india rubber pipes.

MISCELLANEOUS.

877 Ransome, F., Paris, improvements in the manufacture of artificial stone and cement or plaster, and in treating timber, for the purpose of preserving the same.

929 Eden, F. M., Temple, an improved method of manufacturing silicate of lime or hydraulic cement.

937 Jenkins, W., Brompton, improvements in medicated belts or bands for the alleviation of pain in, or prevention of cholera, and for the prevention or cure of pulmonary or other complaints.

942 Leroy, G., Bristol, an improved construction of vessel for containing ærated liquids.

962 Mingaud, P., Paris, new alimentary and chemical products: drinks obtained by specially treating the fruits of a tree called "Arbousier."

977 Smith, M., Birmingham, improvements in annealing pots or pans.

989 Newton, A. V., Chancery-lane, an improved mode of bleaching and refining oils and other fatty substances.

999 Carey, C., Kennington-green, improvements in the apparatus used in making infusions of coffee and other substances.

1012 Henry, M., Fleet-street, improvements in ærated liquid apparatus.

1019 Stevens, C., Charing-cross, a new artificial manure.

1024 Birkbeck, G. H., Chancery-lane, improvements in separating or extracting silver from lead.

1026 Stone, D., Manchester, improvements in arrangements or apparatus for preventing water pipes from bursting by the action of frost.

1048 Cole, R. J., Bayswater, improvements in ornamenting the backs of brushes.

1055 Marshall, J., Liverpool-road, Middlesex, improvements in preventing the fracture of metals from crystallization.

1062 Morgan, T. V., and Dahlke, J. G., Battersea, certain improved filtering agents, one of which is applicable to the manufacture of crucibles.